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CONGENITAL RETINAL FOLD

BY

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LONDON

INTRODUCTION.

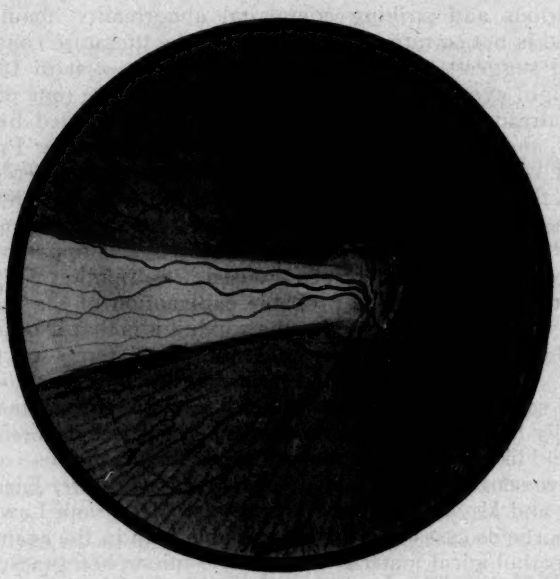
THE curious and striking congenital abnormality about to be described is not so rare as the paucity of the literature concerning it would suggest. Since I first became aware of it in 1928, six cases (eight eyes) have come to my personal notice (one of which I have already published), one case has been reported by Stella Ancona, and at the moment of publication of this paper Professor Weve tells me that he has also collected six cases and is reporting them in the *Arch. f. Augenheilk.* this month. He has shown me his case notes, and the condition is undoubtedly the same. He writes, "It is curious how often one observes this apparently rare condition once one's interest is aroused," an opinion with which I thoroughly agree. The probable explanation of the failure of previous observers to recognize the condition is that it bears some resemblance to persistent hyaloid and other forms of pseudo-glioma. Most of the cases had been diagnosed as pseudo-glioma before I saw them and the eyes which I was able to examine microscopically had been excised on account of suspected glioma.

I would like at this point to express my thanks to those surgeons who have sent me cases,—Mr. Peter Macdonald, Dr. Kirby, Mr. Coulter and Mr. Somerville Martyn—also Mr. Frank Law for the two Moorfields cases and for his valuable help in the examination of the pathological material and for the microphotographs which illustrate this paper.

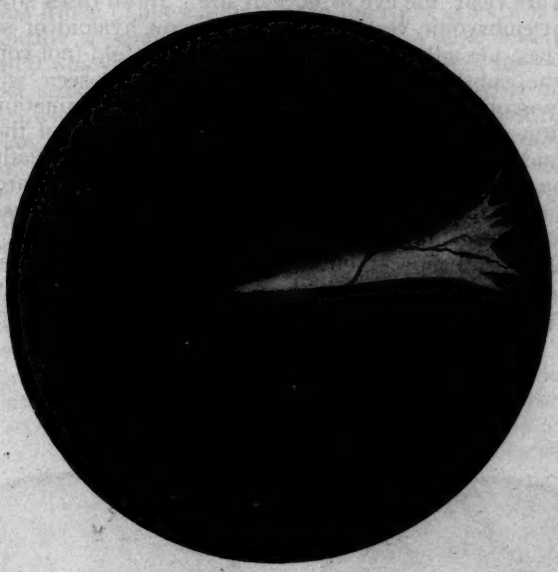
DEFINITION OF THE CONDITION.

The cases belong to a group of defects in the gross structure and differentiation of the inner layer of the optic cup. They arise mostly after the 13 mm. stage (when the cleft is closed) and in most cases the changes do not involve the cleft region and so do not fall into the class of colobomata. In a few the change may begin during the process of closure so that an orientation by means of the cleft is possible, but still the changes are not those of coloboma. All the cases are characterized by the appearance of folds or ridges involving the inner layer of the optic cup and projecting into the vitreous. In some this is shallow, in others high and sharp with a falciform edge. Fine gradations occur and when a series is studied it becomes evident that the deformity links up on the one hand with abnormalities of the cleft region and on the other with a group containing proliferations of the inner layer with rosette and ridge formation and the congenital detachments found in microphthalmic eyes. However, the cases about to be described constitute a definite clinical group to which the term 'congenital retinal fold' should be applied.

Typical cases will now be described from the point of view of ophthalmoscopic appearance, macro- and microscopic appearance and embryology.



Right eye.



Left eye.

FIG. 1.

The right and left eyes (ophthalmoscopic appearance) of a child of 18 months. The left eye shows a high retinal septum stretching from the disc to the temporal side of the equator of the lens. The general level of the fundus is myopic. Retinal vessels pass on to the septum. The lentine end of the septum breaks up into fine branding strands of embryonic tissue attached to the equator of the lens. The right eye shows a symmetrically arranged similar fold which is not so high nor so well marked. This has numerous retinal vessels on its surface.

OPHTHALMOSCOPIC APPEARANCES.

Case 1 (*2 eyes*). Fig. 1 shows the appearance of the eye in a child of 18 months. The general level of the fundus could only be seen with minus lenses and running from the disc outwards in the horizontal meridian towards the temporal edge of the lens was a thick rolled edge visible with a +12·0 D. sphere (with retinal vessels on it) breaking up anteriorly into many strands attached to the ora serrata on the temporal side in the horizontal meridian. This ridge could have no connection with the fissure. The solid appearance of the fold, the septum-like connection with the retina, the presence of branches of the retinal artery on the fold and the attachment anteriorly to the ora serrata, with strands passing to the lens near the equator are characteristic. The vitreous

and lens are clear, the eye of normal size. In all cases strands of persistent embryonic vessels, either the main hyaloid or some of its branches, are adherent to the surface of the fold (not contained within the substance) and may sometimes be seen with the ophthalmoscope, but more often on microscopic examination only.

The situation of the fold is interesting. In most of the cases (Weve and Ancona) it occupied the lower temporal quadrant of the retina, passing from the disc downwards and outwards. In bilateral cases it is symmetrical, but *by no means in all cases does it run downwards and outwards.*

Case 2. Fig. 2 shows the fold in a girl of 9 years. The eye was normal except that in the iris there was a small area of thinning of the stroma down and in, possibly representing a minimal

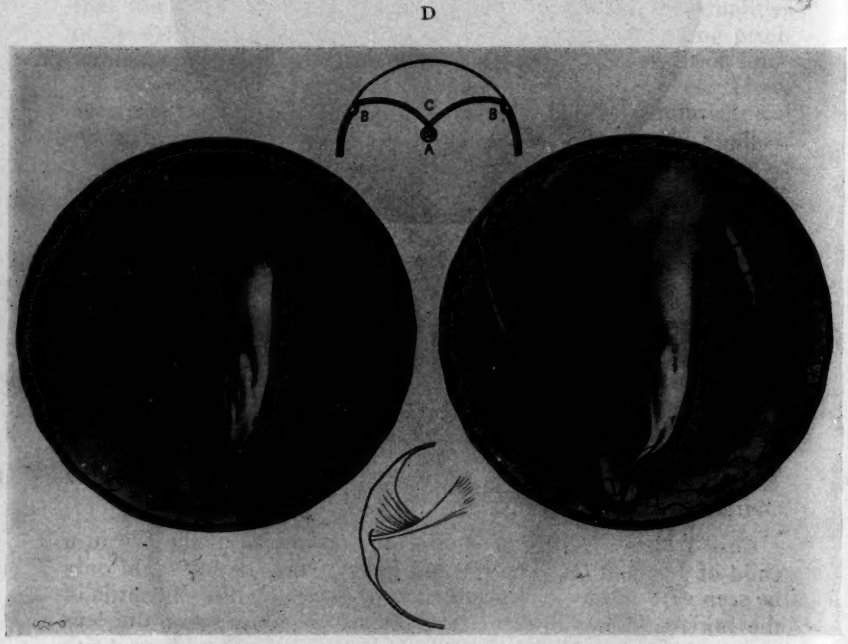


FIG. 2.

Ophthalmoscopic appearance of retinal septum in the left eye of a girl of 9 years. A, as seen with a +12 D. sphere. B, as seen without a lens. C, a diagram showing the vertical disposition of the retinal fold attached to the persistent hyaloid. D, a horizontal section through the fold. (A=the persistent hyaloid in its glial sheath. B=the scar-like adhesion to the pigment epithelium and choroid. C=the tent-like detachment or fold.)

coloboma iridis. (This was present in the right eye also). Ophthalmoscopically a small detachment without a hole and probably congenital was visible in the lower nasal portion of the retina, but the most striking appearances were in the upper part of the eye (thus showing that it had no connection with the fissure). Here a tubular, somewhat cornucopia-like structure ran upwards from the disc opening forwards and disappearing towards the upper edge of the lens. It was white with a little irregular pigment on its surface and became more diaphanous as it passed forwards. It appeared to be a mass formed by proliferation of the glial sheath of the hyaloid. A single vessel left it on the temporal side and disappeared anteriorly. This mass taken alone was typical of a severe persistence of embryonic vessels accompanied by glial overgrowth. The interesting feature, however, was the fact that the retina was adherent to the upper (and posterior) surface of this glial sheath, from the disc upwards for about a third of the distance from the disc to the lens along the abnormal strand. The adherent retina was pulled forward, lines of tension being visible on it, and the base of the localized somewhat tent-like detachment thus formed being marked out by a roughly circular ridge accompanied by pigmentary disturbance, the whole very similar in appearance to those cases of spontaneous limitation of an acquired detachment by formation of a line of scar-like adhesions between retina and pigment epithelium. Fig. 2, A, B, C, and D, show firstly the fundus appearance, with the sharp edge of the retina being pulled forwards by the persistent fibrovascular sheath and secondly, diagrams of hypothetical sections in two planes. In this case therefore the fold passes straight upwards from the disc. The main white mass appears to be formed of the contents of Cloquet's canal, abnormally thickened and attached to the apex of the fold of retina which has been pulled forwards. In this case the hyaloid remnants rather overshadow the fold; in some cases (indeed most) they are small and often invisible except microscopically.

Case 3. Fig. 3 shows, not an ophthalmoscopic picture, but the appearance of a macroscopic specimen (lent me by Mr. Law to whom I am also indebted for Case 5). The eye is cut in vertical section and one is looking at the temporal half. A thick septum of retinal tissue with blood vessels on it (branches of the arteria centralis and the hyaloid) runs from the disc forwards. Its free edge passes across the centre of the vitreous to the back of the lens; its line of attachment runs from the ora serrata in the upper temporal quadrant to the disc along a meridian corresponding to 2 o'clock. The line of the fold is therefore up and out from the disc. The lens is clear. The fold is attached to the lens at the extreme equator on the temporal side in the horizontal

FIG. 3.

Macroscopic appearance of eye containing retinal septum in the upper temporal quadrant. The plane of section is vertical antero-posterior and passes to the nasal side of the disc. The lower expansion is drawn somewhat too far back.

meridian. The fold therefore forms a partition dividing the upper part of the vitreous into unequal temporal and nasal parts. From the anterior end of the fold pass two expansions up and down to be attached to the structures in the region of the ciliary body and back to the walls of the globe as far as the ora serrata. This eye had been excised on suspicion of glioma. The patient was a girl 6 years of age.

Case 4. Fig. 4 shows another macroscopic specimen (sent me by Mr. Peter Macdonald) in which the ridge is not so high nor so sharp as in the preceding case. It runs in this case downwards from the disc along the line of the foetal fissure to the ora serrata, where a small portion of still open fissure can be recognized microscopically, thus placing its line accurately. As in the other cases retinal vessels passed on to the ridge, and a persistent hyaloid (Fig. 10) was adherent to its surface. The portion of retina including the fold showed a shallow detachment. This case I reported in the Transactions of the Ophthalmological Society, 1928.

Case 5 (*2 eyes*). Fig. 5 shows a photograph of another case from the Pathological Department of Moorfields. It is the right eye of a boy of $1\frac{10}{12}$ years. It was excised on a suspicion of glioma. The septum or fold is seen stretching from the disc to be adherent to the lens in the lower temporal quadrant, whence it passes to the ora serrata. Although the other eye of the child was not examined by me there is a note to the effect that there was a greyish band visible ophthalmoscopically on the retina in a similar situation.

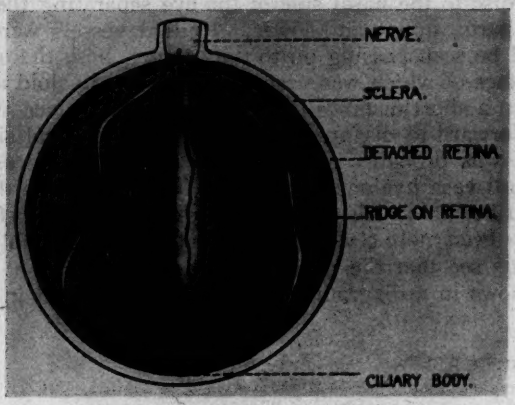


FIG. 4.

Lower half of eye containing retinal fold along the line of the foetal fissure.

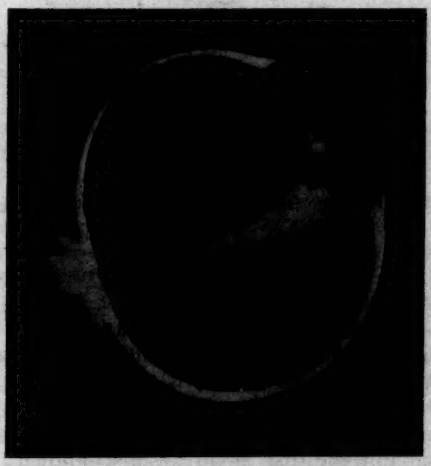


FIG. 5.

Lower half of eye containing retinal septum in the lower temporal quadrant.

Case 6. The sixth case rests on notes sent me by Mr. Somerville Martyn. In this case there was a persistent hyaloid artery attached to a membranous fold or septum which stretched

from the disc to the nasal side of the eye separating the vitreous into two parts, upper and lower. Retinal vessels were present and could be seen passing on to the septum, both the upper and lower surface of which was vascularized. The hyaloid artery left the septum a short distance from the posterior surface of the lens and ran forward to disappear from view on the nasal side of the lens. (It was probably not the main trunk, therefore, but one of the nasal vasa hyaloidea propria). This resembles the second case described in which the fold only extended part of the way and shows even more clearly how these folds are probably formed.

We thus see that the position of the septum is not constant. Fig. 6 shows in a diagram the positions of the fold in these six

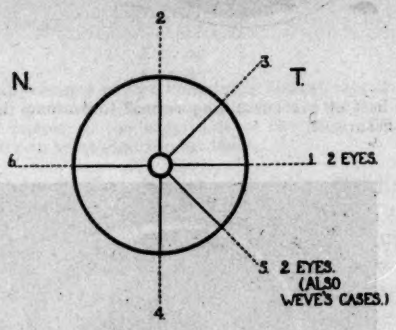


FIG. 6.

Diagram showing position of retinal septum in cases recorded.

cases. In all the disc is involved, but the meridians vary. The temporal side, however, shows by far the greater number. Of my six cases (8 eyes) five were in the temporal half of the retina, one upwards, one downwards and one on the nasal side. In seeking an explanation therefore, a cause capable of acting in any meridian must be found.

Other cases of septum-like reduplication of the retina in situations not involving the disc at all are also known. These again are associated with abnormal adhesion of embryonic vitreous vessels to the inner layer of the optic cup. Fig. 7 shows a microphthalmic eye in which the fold is at the ora serrata and projects equatorially inwards behind the lens. This case does not come strictly within the scope of the present paper but is included to lend force to the contention that retinal reduplications can occur in almost any situation.

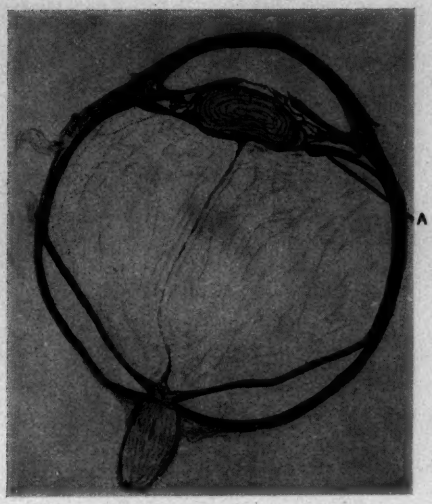


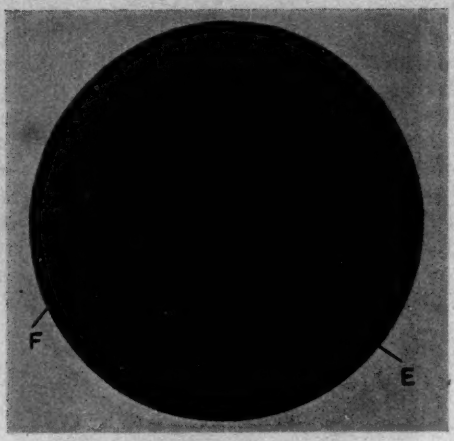
FIG. 7.

Section of microphthalmic eye with retinal fold at the ora serrata (seen at A). The top of the fold is adherent to the vascular capsule of the lens.

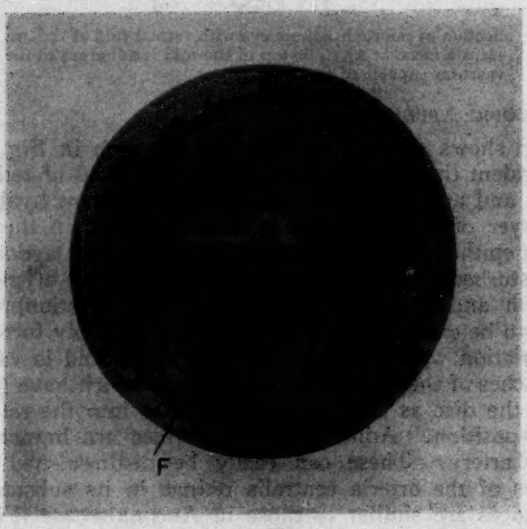
MICROSCOPIC APPEARANCES.

Fig. 8 shows sections through the eye seen in Fig. 3. It is quite evident that the condition is a double fold of retina pulled inwards and attached to an abnormally persistent hyaloid. The inner layer of the optic cup is alone involved in the fold, the pigment epithelium being unaffected. The retinal layers are somewhat disturbed, puckered and distorted with some atypical rosette formation and hypoplasia (imperfect differentiation) of layers. This is to be expected since the fold was probably formed before differentiation was very far advanced. The fold is vascularized by branches of the arteria centralis retinae which have grown into it from the disc as they would have done into the retina in the normal position. Adherent to its surface are branches of the hyaloid artery. These can easily be distinguished from the branches of the arteria centralis retinae in its substance. The appearances are similar to those in Ancona's case (Fig. 9) and the condition falls into the same category except that in her case the ridge occupied the line of the fissure as in my fourth case.

Fig. 10 shows a section of the ridge in Fig. 4. Again the ridge is composed of retinal tissue with the hyaloid artery adherent to its vitreous surface. Fig. 11 shows a section of the case seen in Fig. 5. The appearances are similar to those in Fig. 8.

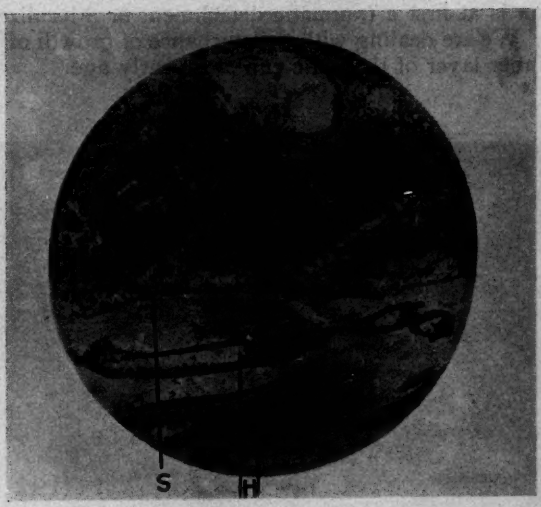


The fold cut at its attachment to the disc. F. The fold. E. The anterior end of the attachment to the ora serrata.

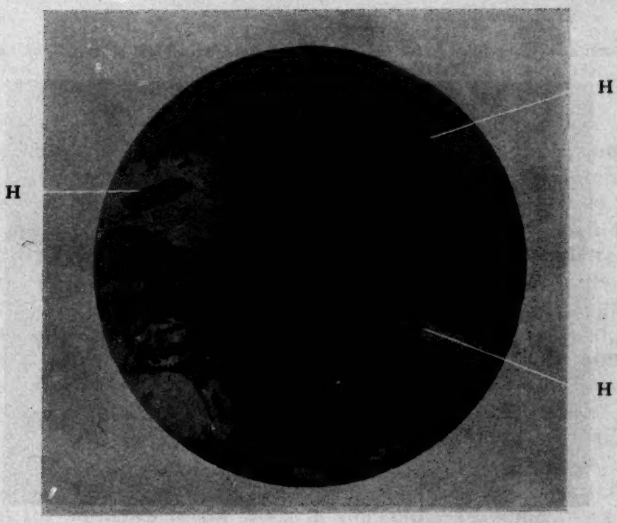


The fold cut along its whole length. F. The fold.

In all the cases which have been examined microscopically the whole of the retina (not only that in the fold) shows imperfect differentiation. This puts out of count any suggestion that the



The hyaloid artery on the surface of the fold. S. Vitreous surface of the fold. H. The hyaloid artery.



H, branches of the hyaloid among puckerings on the fold.

FIG. 8.

Microphotographs of sections of the eye in Fig. 3.

condition is at first a traumatic detachment or a localized inflammation. We are dealing with a disturbance of growth of the whole of the inner layer of the optic cup at an early age.

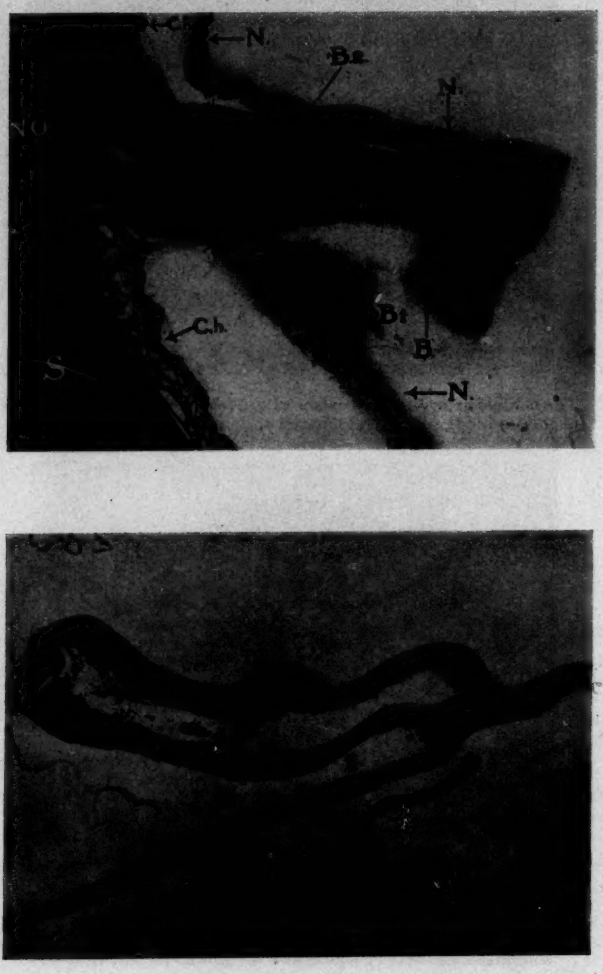


FIG. 9.

Two sections (from Stella Ancona's paper, Nederl. Tijdschrift voor Geneeskunde, Vol. LXXIX, ii. p. 135, 1935) showing the fold near the disc (A) and further out (B)—compare with Fig. 8.

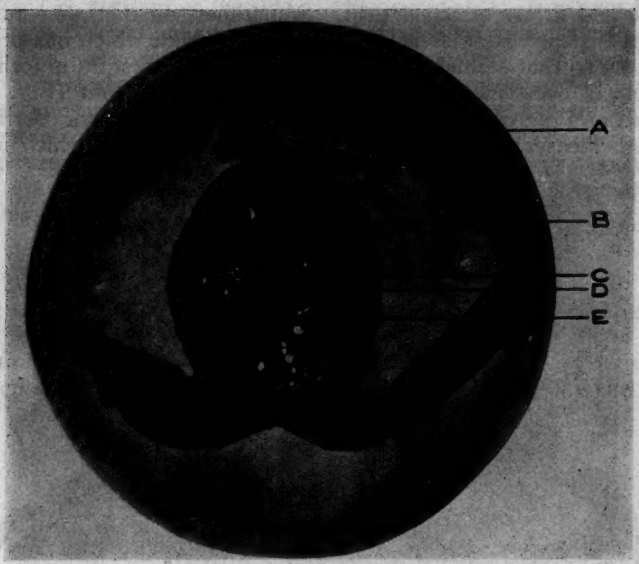


FIG. 10.

Section through the ridge seen in Fig. 4. A, the hyaloid. B, the inner molecular layer. C, D and E, imperfectly differentiated retinal layers.

EMBRYOLOGICAL CONSIDERATIONS.

The main points of embryological importance to be considered are, (1) the nature of the tissue composing the fold, (2) the relation of the fold to the hyaloid artery, and (3) the position of the fold.

1. *The nature of the tissue in the fold.* This is, in all cases which have been examined microscopically, composed of a reduplication of the retina (internal limiting membrane to rods and cones inclusive) without involvement of the hexagonal pigment epithelium. The retinal structure is somewhat disturbed, the layers imperfectly differentiated and rosettes are often present. There can be no doubt whatever in any of the cases that the fold is formed wholly from the inner layer of the optic cup.

2. *The relation of the fold to the hyaloid artery* In all the cases examined microscopically and in many of those seen clinically there is evidence of attachment of the hyaloid artery or one of its branches to the apex of the fold. In some cases this is a single fine strand only. Fig. 10 shows the vessel connected with the top of the ridge in the fourth case by a fine strand of tissue. In Fig. 9, however, the vessel is almost embedded in the

ridge and firmly attached to it. Sometimes, on the other hand, the persistent vessel is enclosed in a glial sheath which has proliferated, so that a thick and imposing tubular structure is formed which is even more arresting than the retinal fold (Fig. 2). Sometimes the vessel and the ridge both extend to the ora serrata. In other cases, however, the vessel leaves the ridge (which may

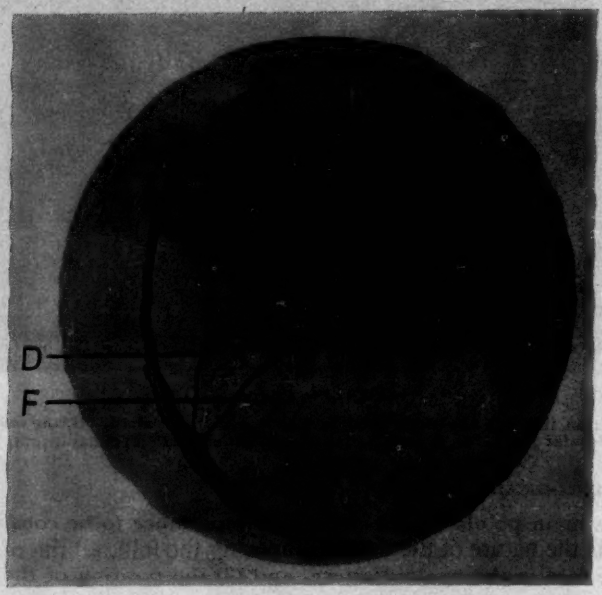


FIG. 11.

Microphotograph of the retinal ridge in Fig. 5. D, detached retina. F, fold composed of two layers of retina.

then flatten down) and runs on alone as a single or a branching strand, to the lens (Cases 2 and 6). In all cases the vessel was displaced somewhat from the centre of the eye and was not attached to the posterior pole of the lens, but to some point near its equator. This makes it possible that the vessel which persists is not the main trunk but is one of the vasa hyaloidea propria. On the other hand, however, it is quite possible that it is the main trunk which has become displaced and separated from the lens because of its adhesion to the fold. It may or may not be impervious to blood. Blood is seen in it in Fig. 8.

3. *The position of the fold.* This is variable. It cannot have primary connection with the foetal fissure though, as we have seen, it can sometimes occupy the position of this. It can apparently occur in any meridian, but according to Weve's cases and some of mine there is a marked predilection for the lower temporal quadrant, external to the line of the fissure. No structure exists here normally capable of determining this position, nor are the embryonic vitreous vessels larger here. At present no reason can be given.

SUGGESTED MECHANISM OF PRODUCTION OF THE DEFORMITY.

It is apparent that embryologically speaking the defect consists of the adhesion of the primary vitreous and its contents to one portion of the inner layer of the optic cup, the secondary vitreous which should normally separate them being absent along the line

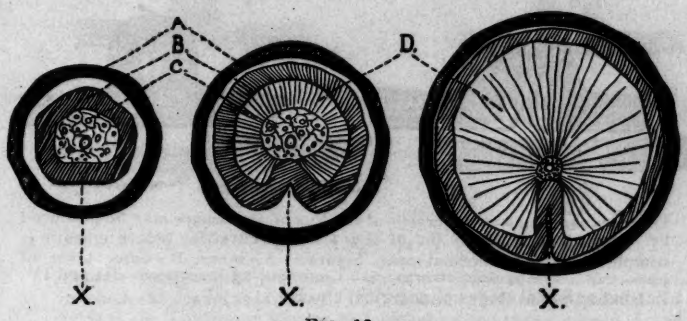


FIG. 12.

Diagram showing formation of a retinal fold. 1. Equatorial section of eye at 13 mm. stage. A = choroid and pigment epithelium. B = inner layer of optic cup. C = primary vitreous. X = point of adhesion between primary vitreous and inner layer of optic cup. 2. Equatorial section at beginning of formation of secondary vitreous D. This is absent at the point of adhesion X. 3. The fully formed fold in the adult.

of adhesion. Secondarily to this adhesion both the structures involved become displaced, the inner layer of the cup being detached (or rather prevented from coapting with the outer layer) and raised up into a ridge, and the contents of the primary vitreous becoming displaced from the optic axis towards the side of the adhesion. We can represent what happens in a series of diagrams (Fig. 12). In the first diagram we see an equatorial section of an eye at the 13 mm. stage. A represents the choroid and pigment epithelium. B is the inner (retinal) layer of the optic cup not yet in contact with the outer layer, and C is the primary vitreous,

richly vascular, which fills the whole eye at this stage. Let us postulate an abnormal adhesion of one or more vessels to the retina at the point X at this stage.

The second diagram shows the same eye at about the 48 mm. stage. Secondary (avascular) vitreous has formed from the inner layer of the optic cup and as the eye has increased in size we get the apparent compression of the primary vitreous in the centre of the eye where it forms Cloquet's canal. If the adhesion is still present at the point X the secondary vitreous will have been pre-

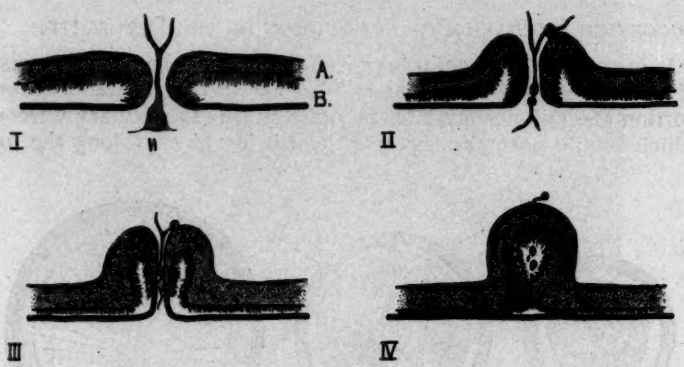


FIG. 13.

Diagram showing how inversion of the lips of the fissure may be produced by adhesion of a vessel (or of the primary vitreous) before closure is complete. I. The normal open fissure. A = inner, B = outer layer of optic cup. H = hyaloid artery. II. Commencing inversion. III and IV. Further and final stages of abnormal closure.

vented from forming here and the inner layer of the cup will have been pulled up into a narrow tent-like detachment. If this continues as the eye grows the condition in the third diagram will occur, which is almost identical with that found in the actual sections.

If the adhesion happens to occur along the line of the cleft while this is first closing at the 13 mm. stage, a slightly different mechanism may occur. Both edges of the cleft may be pulled inwards and a condition of abnormal *inversion* of the inner layer (the opposite of the abnormal *eversion* which precedes the formation of a coloboma) may occur. This is shown diagrammatically in Fig. 13, and is what I presumed had occurred when I first reported Case 4, in 1928. I, shows the open fissure with the hyaloid passing through it. II, shows inversion with adhesion of branches of the hyaloid to the edge. III, is a further stage, and IV is the final stage after fusion. In this case the interior of

the fold was occupied by some aberrant vessels which had become included as closure occurred and by some hyaline material derived probably from abnormal rods and cones.

A somewhat similar scheme might explain Ancona's case, in which there was a curious aberrant strand of nerve fibres on the deep surface of the inner layer in the fold. Fig. 14 shows a possible explanation, though Ancona's own, that the condition was due to the persistence of the connecting portion of von Szily's primitive epithelial papilla is also possible. 1, shows the fissure

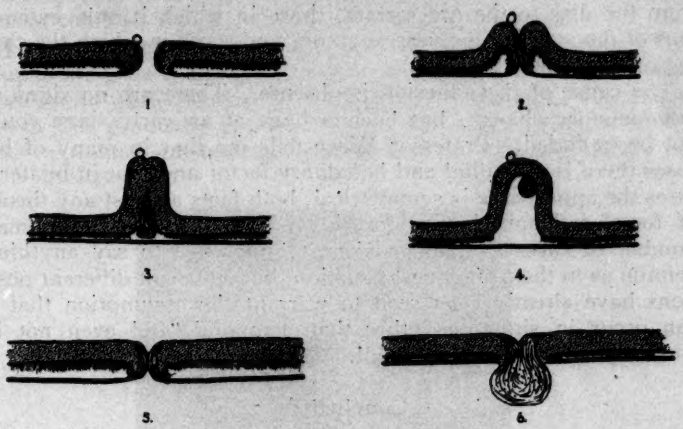


FIG. 14.

Scheme to explain the presence of abnormally placed nerve fibres in cases in which the fissure is involved. 1. Aberrant nerve fibres passing out of fissure. 2. The fissure closing and including the nerve fibres. 3 and 4. Two forms of closure with abnormally placed nerve fibres. 5 and 6. Normal development of the cauda in birds.

closing with the vessel adherent to one of its lips and aberrant nerve fibres passing out along its margins. 2, shows the beginning of the fold and the nerve fibres included in the inner layer. 3 and 4, show possible further stages with formation of an aberrant bundle of nerve fibres. This is in accordance with von Szily's experimental work on abnormal closures of the fissure. He showed that such aberrant bundles of nerve fibres were common in the malformed eyes of the embryos of the colobomatous stock he used. It would be quite reasonable to suppose that they might occur in other abnormalities of closure of the fissure also. The condition has its parallel in the normal development of birds in which the cauda of the optic nerve is formed by just such an outgrowth of nerve fibres through the closing fissure. This is seen in 5 and 6 (Fig. 14).

These modifications of the process seen in Fig. 12 are merely dependent on the vessel happening to adhere to the inner layer of the cup in the cleft region.

This theory, that the condition consists essentially of abnormal adhesion of the primary vitreous to the inner wall of the optic cup with hindrance of formation of secondary vitreous in that situation appears to be consistent with the clinical findings. It explains the presence of embryonic vitreous vessels on the free edge of the fold and is consistent with all the three types of case described, namely those in which the fold extends all the way from the disc to the ora serrata, those in which it only extends part of the way but the vessels go on, and those in which the cleft region is involved.

The cause of the adhesion is obscure. There are no signs of inflammatory change, but haemorrhage at an early stage could not be excluded. Professor Weve tells me that in many of his cases there is a familial and hereditary factor and that in bilateral cases the appearance is symmetrical, both facts against any theory of foetal inflammation or fortuitous haemorrhage. The small number of cases available makes it impossible to say anything definite as to the commonest situation, but sufficient different positions have already been seen to warrant the assumption that it can occur in situations other than temporal, and even not in connection with the disc at all.

Conclusions

This paper deals with a little known condition which can be described as "congenital retinal fold." Cases are described, all showing a falciform fold projecting into the vitreous, composed of a double layer of retina supplied by branches of the retina centralis retinae and having adherent to its surface remains of embryonic vitreous vessels. The fold has been found in many situations.

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A TICK ON THE UPPER EYE-LID

(*Dermacentor auratus* nymph)

BY

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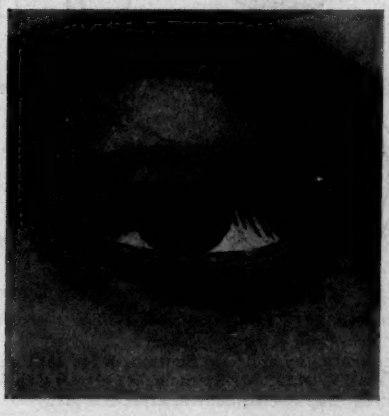
THE following rare and interesting case recently came for treatment at the Eye Infirmary, Medical College, Calcutta.

M. I. Mohamedan male, 22 years of age, a shoe-maker by occupation, gave a history of being bitten by an insect on the upper eyelid while playing with a dog two weeks ago. The small growth was gradually getting larger. On examination, a small Tick was found attached to the inner end of the lower border of



Tick on the upper eye-lid (*Dermacentor auratus* nymph).

the left upper eyelid. Under cocaine anaesthesia it was removed without difficulty. Microscopic examination showed that it was a nymphal form of *Dermacentor auratus*. It has been recorded a few times from man in India but usually lives on wild animals.

A drawing of the *Dermacentor auratus* nymph by Sharif is shown in Fig. 1.

Nymph.—The scutum is sub-hexagonal, being broadest in the middle. Its size is 0·5 × 0·54 mm. It is brown in colour, changing to reddish-brown near the eyes. The cervical grooves are anteriorly deep and convergent; they then become divergent and superficial and finally disappear in the posterior third of the scutum. The

lateral grooves are shallow and superficial and together with the cervical grooves enclose superficial cervical fields. There are ill defined superficial grooves along the antero-lateral margins of the scutum. The punctuations are few and superficial, and are present only in the posterior portion of the median field. The spiracle is pear-shaped. Coxa I has two fairly strong, well separ-

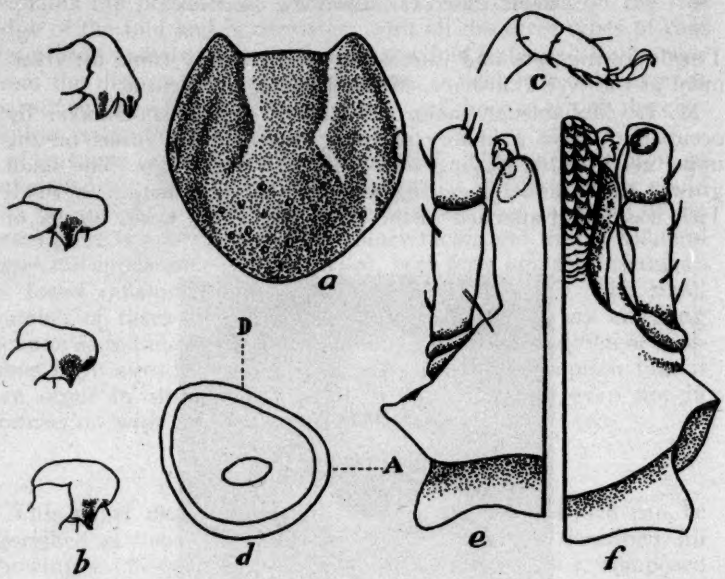


FIG. 1.

Dermacentor auratus nymph: (*a*) Scutum, ×71; (*b*) Coxal armature, ×55; (*c*) Tarsus IV, ×55; (*d*) Spiracle, ×140; (*e*) Capitulum, dorsal aspect, ×128; (*f*) Capitulum, ventral aspect, ×128.

ated and equal spurs. Coxae II-IV have each a pointed triangular spur near the external angle. Tarsus IV tapers gradually and is without any ventral spur. The pad attains two-thirds the length of the claws.

The capitulum differs considerably from that of the adult. It is 0·38 mm. in length. The base is hexagonal in shape with the lateral angles strongly pointed and salient; it is two and a half times as broad as long. The cornua are absent. The palps are long, being four times as long as broad. All the articles of the palps are distinct. Article I bears a long slightly feathery hair on its infra-internal margin. Article II is twice as long as Article III and is without any ridge or salience: it bears one long hair on

its supra-internal and one hair on the infra-internal margin. Article III is longer than broad. The hypostome is strongly spatulate and possesses 3/3 rows of teeth with six strong teeth in each row in the anterior half, and these are followed by 2/2 rows of seven scale-like teeth.

Distribution and hosts. The species has so far been recorded from Borneo, Java, Sumatra, Burma, and new records show that the distribution of the species extends almost throughout India. It normally attacks only wild animals and hence is of little economic importance.

I wish to express my thanks to Doctor C. Strickland, Professor of Entomology at the Tropical School of Medicine, Calcutta, for identifying the specimen.

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RED MULTIPLE MADDOX ROD WITH A PRISM*

BY

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AFTER considerable difficulty had been experienced in obtaining a Maddox rod without an undesirable prism of varying strength, the advantage of incorporating a prism of known strength in the Maddox rod became apparent and the rod to be described was constructed.†

The literature from 1890 (the time when Maddox[1] first presented this important diagnostic instrument) to the present apparently contains no reference to the intentional incorporation of a prism in the rod‡ or the routine use of a weak prism with the rod although its optical defects have been noted,[2] and ingenious adaptations have been suggested.[3, 4]

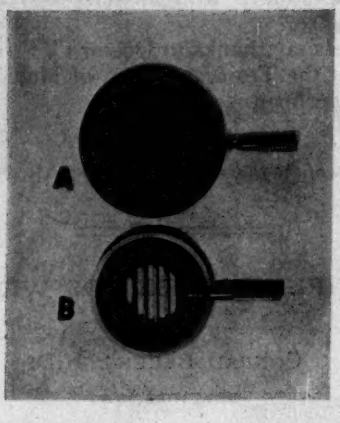
One of the cleverest adaptations is that of Ballantyne[5] who modified the Maddox rod so that the vertical and horizontal deviation could be determined simultaneously and the axis of the single prism indicated without the use of formulae or prismometric scales, which will correct the combined deviation.

* Presented before the American Ophthalmological Society, June 5, 6, 7, 1935, Hot Springs, Virginia.

† Made by E. B. Meyrowitz Company, New York, N.Y.

‡ This statement was confirmed by Miss Maddox.[6]

Description of the Maddox Rod and Prism.—A red multiple Maddox rod was constructed, with a 0·75Δ prism with the base at right angles to the rod image. Two sizes were ordered, one to be inserted into the trial frame of usual size (Fig. A), the other to be used with the Bausch and Lomb Ophthalmic Test Lenses (Fig. B). A short handle, in line with the streak image, attached to the frame, facilitates rapid rotation of the device and



A red multiple Maddox rod with a 0·75Δ prism. (A) for insertion into a trial frame for lenses of the usual size; (B) for use with the Bausch and Lomb Ophthalmic Test Lenses.

reversal of the position of the base of the prism. Colourless multiple rods also are obtainable with the 0·75Δ prism incorporated.

Method of using this Maddox Rod and Prism.—In the examination of a person with no vertical imbalance of the ocular muscles, quickly rotating the prism will cause the line to appear alternately above and below the light at approximately equal distances. With the rod held over the right eye and the prism base up, if the red streak of light is observed to be exactly through the centre of the light, the patient has 0·75Δ of left hyperphoria. This test enables the examiner to make rapid measurements and to eliminate vertical errors which are less than 0·75Δ.

Advantages of the Combined Maddox Rod and Prism.—The rod is especially useful in the study of small vertical deviations, and in quickly eliminating low degrees of lateral imbalance. It is well adapted for the examination of applicants for the Air services of the Army and Navy because negligible amounts of heterophoria

may be quickly and easily eliminated. Simulation may be studied rapidly without the introduction of other prisms of questionable strength.

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PHOSPHOLIPID CONTENT OF CATARACTOUS HUMAN LENSES*

BY

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LITTLE quantitative work has been done on the phospholipid content of crystalline lenses, especially those which are cataractous. Several reports of qualitative nature, however, have been published on myelin-like or birefractive substances in cataractous lenses.† Mettenheimer (1857) was the first to describe birefractive substances, regarded as myelin, in cataractous lenses; these were not found in normal lenses. Laptschinsky (1876) made the first quantitative estimation of lecithin in normal ox lenses and found it to constitute 0·23 per cent. of the dry weight, however the ages of the animals and method of analysis were not published. Cahn (1881) carried out a quantitative estimation of lecithin in both normal and cataractous human lenses; the former contained 0·63 and the latter 0·80-4·52 per cent. of the dry weight. But he, like his predecessors, neglected the age factor. Furthermore, no differentiation between lenses extracted by the intra- and extra-capsular methods was made. By the first method one obtains the entire lens, and by the second only the nucleus and a small amount of cortex. In later investigations all lipids, for which the lenses have been analyzed, were found to increase in both normal and cataractous lenses with advancing age; they have been found

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† For a detailed discussion of myelins and birefractive substances found in cataractous lenses see Krause (1932, 1934, 1935).

also in larger amounts in the nucleus as compared with the cortex (see bibliography by Salit and O'Brien, 1935). Cahn also gave no description of his method, but did state that the lenses were collected and preserved in alcohol until a sufficient number were obtained for an analysis. This feature in itself invalidates the results to a certain extent, since phospholipids in the tissue are now known to undergo various chemical changes on standing, even when preserved in alcohol (see Leinfelder and Salit, 1934). The importance of Cahn's work lies in the demonstration of lecithin in cataractous as well as in normal human lenses. Most of the later investigations have been qualitative in nature, simply corroborating earlier observations and adding only a few new discoveries. Thus Mlle. Toufesco (1906), as well as Vogt (1922), corroborated the findings of Mettenheimer as to the presence of myelin-like substances in cataractous lenses, and their absence in normal lenses; however, they also observed vacuole formations in connection with myelin. Mlle. Toufesco attributed these abnormalities to fatty degeneration. Myelins, such as those described by Mettenheimer, were also identified by Hoffman (1913) in more than thirty cataractous human lenses by means of a polariscope, whereas the results of his tests on normal lenses were doubtful. In 1914 he noted that myelins were present in lamellar, traumatic, complicated, and senile cataracts, also in the normal lens of the calf after autolysis or incubation in a weak alkaline solution for half-an-hour in the presence of thymol; he never found them in the normal human lens. He believed that myelin forms occurred after degeneration of the lens, chiefly through the action of certain enzymes resident in the lens tissue. Jess (1913) found no difference in the lecithin content of normal and cataractous ox lenses. Wessely (1922) reported having detected birefractive calcium soaps, phosphates, and carbonates mixed with cholesterol in cataractous lenses. According to Goldschmidt's (1922) quantitative tests on post-mortem human lenses, the phospholipid content of infant lenses up to one year of age is 0·41 per cent. of the dry weight. Between one and ten years it amounts to 3·13 per cent., reaching its maximum between the ages of ten and twenty years. After the age of twenty the values vary between 4·13 and 4·43 per cent., the latter value being for ages between seventy and seventy-five years. Busacca (1925) found oil droplets in one case of black cataract; these evidently were of the same nature as those which Vogt (1922) and others found in senile cataracts which Vogt called myelin droplets. Kranz (1927), who studied both normal and cataractous human lenses with a polariscope, found myelin-like substances in seventeen out of twenty-five cataractous lenses. They were present also in cataracta brunescens. The myelins in ordinary light showed structures resembling droplets

or sausage-like formations with pointed or round processes; they were transparent, somewhat yellowish in colour, and bicontoured; frequently they also appeared in the form of threads. He, contrary to Hoffmann's observation, noted that myelin was not birefractive in the lens after autolysis. Liquid spherocrystals were found only in senile lenses. Kranz analyzed ten traumatic cataracts produced by perforation, and the same number of lamellar cataracts, but found no birefractive myelins or spherocrystals. In four cases of traumatic cataract, produced by blunt injury, unusually large amounts of birefractive myelins as well as spherocrystals were present. Clear lenses never contained myelin or other birefractive lipids. Metzger (1931), also using a polariscope, examined seventy-five post-mortem human lenses among which were eleven with coronary cataract. The latter showed birefractive lipids and vacuoles between the lens fibres; in clear lenses they were absent. According to data from our laboratory, published in 1931, the average values of the phospholipid content of both normal animal lenses and cataractous human lenses are, in terms of wet weight, as follows: 0·119 per cent. for five week-old calves, 0·110 per cent. for two year-old oxen, 0·131 per cent. for rabbits, and 0·99 per cent. for twenty cataractous human lenses, with a variation between 0·48 and 1·88 per cent. The analyses were carried out by the colorimetric method of Whitehorn (1924). At that time, however, no attempt was made to classify the cataractous lenses into incipient, intumescent, and mature stages; neither was any distinction made between lenses extracted by the intra- and extra-capsular methods. For these reasons the data on cataractous lenses cannot be used in a comparative study. Krause (1935), who recently analyzed the lenses of one year old oxen, reports their phospholipid content to be 0·193 per cent. of the wet weight, or 0·575 per cent. of the dry weight.

On the basis of the foregoing data the general opinion has been that cataractous lenses contain more phospholipids, especially lecithin, than do normal lenses. The present work, however, which was carried out on one hundred cataractous human lenses, extracted by the intra-capsular method, strongly indicates just the reverse, *i.e.*, it shows a diminution of phospholipids in cataractous lenses as the cataract approaches maturity.

As already stated, most of the previous work on the lipids of crystalline lenses, especially cataractous lenses, has been of qualitative nature only and no distinction has been made between those removed by the intra- and extra-capsular methods. The significance of such a distinction has been pointed out by Zehender, Matthiessen, and Jacobsen (1877, 1879) with respect to cholesterol, the latter being present in much larger quantities in the nucleus. By analogy one would expect this to be true of phospholipids or

lipids in general. Furthermore, no attempt has been made to compare the phospholipid content of incipient cataracts with that of more advanced types, also the age factor has been frequently neglected. In the present study all these points have been carefully considered and for this reason the results differ diametrically from those of previous investigations.

The fact that many investigators found, by means of a polariscope, myelin-like, birefractive substances in cataractous, but not in normal lenses, does not indicate an increase of phospholipids *in toto* in cataractous lenses as compared with normal lenses; these myelin-like, birefractive substances, as Krause (1934, 1935) points out, arise in all probability from the unmasking (1) of the phospholipids, *i.e.*, lecithin, kephalin, and sphingomyelin, and (2) of the cerebrosides, namely, kerasin, phrenosin, nervone, and hydroxynervone. In addition, many organic and inorganic substances, such as calcium salts and cholesterol esters may also be birefractive. Under the influence of certain agents, such as infra-red rays, ultra-violet rays, electric shock, diabetic ketosis, faulty metabolism, blunt injury to the eye, etc., evidently some sort of disruption occurs in the phospholipid molecule and the fragments separate out in the form of liquid spherocrystals or oil droplets which may consist of glycerol and fatty acids. In their natural state the lipids act as protective agents for the tissue protein against excessive water absorption and the influence of certain toxic substances. When, however, the lipids decompose, they not only lose this protective function, but, in addition, liberate harmful substances such as fatty acids, which may tend to coagulate the lens protein (see bibliography by O'Brien and Salit, 1931) or combine with calcium, forming more or less insoluble calcium soaps. The decomposition of the phospholipids may even proceed to the point of liberation of the phosphorus from its choline radical. This phosphorus then goes into the formation of the insoluble calcium phosphate, which is not extractable from the lens by the usual fat solvents. The end-result, as ascertained by the colorimetric method,* is diminution in phospholipids in cataractous lenses. This is in accordance with Wessely (1922) who detected birefractive calcium soaps, phosphates, and carbonates mixed with cholesterol in cataractous lenses. This explanation is also strongly supported by the fact that the calcium content of cataractous lenses increases proportionately with the development of the cataract (Salit, 1933), most of the calcium evidently being derived from the surrounding aqueous and

* It is the phosphorus content of phospholipids that is estimated in the colorimetric method, and from the phosphorus the amount of phospholipid is calculated in terms of lecithin.

vitreous humours. Some of the decomposition products may also disappear from the lens by diffusion into the surrounding aqueous and vitreous humours.

Experimental Technique

The chief differences in the phospholipid values of crystalline lenses, as reported by a number of investigators, are to be attributed to differences in methods, some of which are less reliable than others. For this reason it is of prime importance to include a short description of the modified Whitehorn's (1924) colorimetric method which was employed.

All lenses were studied with the slit-lamp microscope and extracted by the intra-capsular method. The lens was then placed on a small piece of filter paper of known weight (ca. 0·1 gm.) and weighed on a sensitive balance. It was spread into a thin layer on the filter paper by means of a porcelain spatula and the paper was rolled in such a way that the lens paste came to lie between the two surfaces. The preparation was placed in a drying oven for approximately one hour at a temperature of 60° C. in order to drive off excessive moisture without permitting it to become entirely dry. The latter precaution was taken to prevent possible occlusion of lipids in subsequent extractions with fat solvents. The specimen was placed in a 25 c.c. Erlenmeyer flask and covered with 2 c.c. of chloroform. It was allowed to stand in the dark, at room temperature, for one day or longer, after which the mass was macerated with a blunt stirring rod and the extract decanted on a small filter and filtered into specially made pyrex test-tubes, 6 x $\frac{3}{4}$ inches, graduated into 15, 20, and 25 c.c. The pulverized residue in the flask was then treated with 2 c.c. of 1 : 4 ether-alcohol mixture and the extract filtered into the same test-tube. This was repeated twice with acetone, after which the filter paper was washed three times with 0·5 c.c. portions of acetone. The combined extracts were evaporated at 65° C. To the lipid residue in the test-tube were added 2 c.c. of 1 : 1 mixture of sulphuric and perchloric acids. The test-tubes were covered with vials of an appropriate size and imbedded in a sandbath. The sandbath was heated with a Bunsen burner having a burner tip with six horizontal holes, and the flame was so adjusted that complete digestion occurred in three hours. Care was taken to stop digestion as soon as the contents became perfectly clear. If digestion is continued much longer there may be some loss in the phosphorus content. After cooling, the contents were diluted with distilled water to 15 c.c. and then thoroughly mixed with a stirring rod. For standard, a similar tube, containing 0·05 mg. phosphorus in a 5 c.c. volume of solution, plus 2 c.c. of the sulphuric-perchloric acid reagent,

was diluted in the same way. At this point the following reagents were added to both the sample and the standard, as outlined by Whitehorn: 2 c.c. of a twenty per cent. sodium sulphite solution, 2 c.c. of the molybdate reagent, and 1 c.c. of a one per cent. hydroquinone solution.* The contents were mixed with a stirring rod after each addition. The tubes were immersed in boiling water for 15 minutes, then cooled in ice water, after which the colours were compared in the usual manner. The calculation was carried out as follows:—

$$\frac{St \times 1{\cdot}253 \times 100}{S \times \text{wt. of lens in gm.}} = \text{milligrams phospholipid, where}$$

St = the reading of the standard; S = the reading of the sample; 1·253 = milligrams phospholipid corresponding to 0·05 mg. of phosphorus in the standard; 100=per cent. or 100 gm. of the lens substance.

This procedure estimates phospholipid in terms of lecithin. Of all the phospholipids, lecithin is the most abundant in animal tissue, including the crystalline lens. According to Krause, there is almost twice as much lecithin in one year-old bovine lenses as there are kephalins and sphingomyelins combined. It is also assumed that the other phospholipids do not differ greatly from lecithin with respect to their relative phosphorus content. The phospholipids, therefore, may be expressed in terms of lecithin without committing gross errors in the calculation of their absolute amounts. But even if this study entailed such errors with respect to their absolute amounts, they in no way would invalidate its main object, namely, the answer to the question: Does the phospholipid content of cataractous lenses differ in any way from that of normal lenses?

Results

In Table I the results are summarized in terms of minimum, maximum, and average phospholipid values as found in the three groups of cataractous lenses, *i.e.*, incipient, intumescent, and mature types. In Table II the results, also in terms of minimum, maximum, and average values, are arranged according to age in decades.

From these data it is seen that the phospholipid content of incipient cataracts (0·534 per cent.) exceeds that of intumescent cataracts (0·481 per cent.) by 53 mg. per cent., and that of mature cataracts (0·470 per cent.) by 64 mg. per cent. A similar relation-

* For best results one should use a perfectly colourless hydroquinone solution. It is possible to preserve it in this condition for about one week by keeping it in the ice box in the dark and without the addition of sulphuric acid. The molybdate reagent, likewise, should be kept in the ice box.

ship is expressed also by the corresponding absolute phospholipid values, these being 1·075, 0·971, and 0·932 mg. for incipient, intumescent, and mature types respectively. The same tendency is displayed also by their limits in variation, both on the basis of per cent. and absolute amount of phospholipid. This is more apparent if only the incipient and the mature stages are compared, leaving out the intermediate or intumescent stage. This stage is not as clearly defined in its clinical characteristics as the other two, and besides, it is represented by a much smaller number of lenses as compared with the incipient and mature stages. For this reason, the results for this type of lenses are subject to greater irregularities.

TABLE I—Minimum, Maximum, and Average Phospholipid Values of Cataractous Lenses in Various Stages of Development.*

Stage	Age of Patient	Duration, years	Weight, gm.	Mg. phospholipid, per lens	Per cent. phospholipid
Incipient -	42–87	0·7–7·0	0·1392–0·2970	0·691–1·675	0·402–0·702
Averages -	67·2 (70)	2·7 (68)	0·2045 (69)	1·075 (62)	0·534 (60)
Intumescent -	70–85	1·0–12·0	0·1622–0·2408	0·722–1·253	0·368–0·597
Averages -	74·0 (12)	3·3 (12)	0·2055 (12)	0·971 (11)	0·481 (11)
Mature - -	52–81	1·0–25·0	0·1127–0·2957	0·511–1·362	0·241–0·791
Averages -	69·4 (34)	4·4 (35)	0·1990 (36)	0·932 (28)	0·470 (28)

TABLE II—Minimum, Maximum, and Average Phospholipid Values of Cataractous Lenses according to Age in Decades.

Decade	Age of Patient	Duration, years	Weight, gm.	Mg. phospholipid, per lens	Per cent. phospholipod
V - -	42–49	1·0–5·0	0·1392–0·2731	0·511–1·266	0·277–0·606
Averages -	45·1 (7)	2·8 (6)	0·2062 (7)	0·904 (6)	0·453 (6)
VI - -	51–59	0·8–7·0	0·1553–0·2358	0·570–1·271	0·317–0·702
Averages -	55·1 (14)	2·4 (13)	0·1871 (14)	0·904 (13)	0·506 (13)
VII - -	61–70	0·7–7·0	0·1500–0·2628	0·548–1·362	0·241–0·791
Averages -	66·3 (41)	3·0 (40)	0·1942 (40)	0·977 (35)	0·513 (34)
VIII - -	71–80	1·0–25·0	0·1591–0·2970	0·704–1·663	0·371–0·660
Averages -	75·6 (46)	4·1 (44)	0·2120 (46)	1·056 (38)	0·513 (38)
IX - -	81–87	1·0–5·0	0·2040–0·2957	1·076–1·675	0·441–0·713
Averages -	83·8 (8)	2·8 (8)	0·2401 (7)	1·254 (8)	0·533 (7)

* Figures in parentheses indicate the number of lenses examined.

In agreement with data reported previously (Salit, 1933; Salit and O'Brien, 1935), it is seen from Table I that, on the average, cataractous lenses of the mature type weigh slightly less (0·1990 gm.) than those of the incipient type (0·2045 gm.). The average durations of the cataractous conditions, also in accordance with previous data, are 2·7, 3·3, and 4·4 years for the incipient, intumescent, and mature stages respectively.

From the data in Table II, where the arrangement is according to age, all the values (minima, maxima, and averages) in the last two columns (marked "Mg. phospholipids per lens" and "% phospholipids") increase with age. This is true also with respect to the relative average weights of the lenses, and to a lesser degree with respect to their minima and maxima.

Summary

The phospholipid content of each of 100 cataractous human lenses was estimated. All the lenses were examined with the slit-lamp microscope and classified as incipient, intumescent, or mature cataracts, after which they were removed *in toto* by the intra-capsular method. The lenses were weighed immediately after removal and the lipids were extracted successively with chloroform, ether-alcohol, and acetone. The phospholipids were estimated as lecithin by a modification of the colorimetric method of Whitehorn. In this study are included: age of the patient, stage and approximate duration of the cataract, weight of the lens, milligrams of phospholipid per lens, and per cent. of phospholipid.

The results indicate a definite decrease in phospholipids of cataractous lenses as they approach maturity. This fact is shown by both the absolute and relative values, the former decreasing from 1·075 mg. per lens in incipient cataracts to 0·971 mg. in intumescent, and 0·932 mg. in mature cataracts, and the relative values decreasing from 0·534 per cent. in incipient to 0·481 per cent. in intumescent, and 0·470 per cent. in mature cataracts. The phospholipids, however, increase with age, both on the absolute and relative basis. This is shown by the data as arranged according to age in decades, covering all ages from 42 to 87 years inclusively; thus the absolute value of 0·904 mg. per lens or 0·453 per cent. in the fifth decade is increased to 1·254 mg. per lens or 0·533 per cent. in the ninth decade.

So far it has been assumed that the phospholipid content of cataractous lenses increases as the cataract advances. This error was due chiefly to the following: (1) Omission of age; (2) failure to differentiate between intra- and extra-capsular lenses; (3) failure to classify the lenses according to the maturity of the cataract; and (4) confusion of phospholipids in their natural forms with

their decomposition products, *e.g.*, birefractive myelins, liquid spherocrystals, calcium soaps, and other birefractive substances.

Dr. C. S. O'Brien, Head of the Department of Ophthalmology, gave valuable help throughout this work.

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RECURRENT VISION WITH A MOVING STIMULUS OF ALTERNATING INTENSITY*

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THE temporal course of the visual sensation produced by a brief stimulus has been observed by causing a bright image to travel across the retina in a circular path. Observations have been made with a stimulus of alternating intensity and also with one of constant intensity. Various speeds of traverse were used, and also varying intensities and conditions of dark adaptation.

The moving stimulus was obtained by rotating an opaque disc, which had a radial slot cut in it, in front of an illuminated sheet of opal glass. The glass was illuminated by an electric lamp placed in a large white box of which the glass formed one side. By this means a very high intensity of illumination was obtained. Alternating intensity of illumination of 100 cycles frequency was obtained by supplying the lamp with 50 cycle alternating current. Constant intensity was obtained by running the lamp off batteries. When a large lamp was used to obtain high intensities, the variation in intensity was much smaller owing to the increased thermal lag. A red lamp was provided in a position inside the circle to assist in keeping the eye steady and to ensure that extra-foveal vision was used.

When the disc revolved at slow speed (about 2 revs. per second), a broad bright band was seen, which with a coloured stimulus (obtained by placing a filter over the slot) was the same colour as the stimulus. This band moved round with the disc. Using alternating intensity this band was divided into light and dark radial strips which remained stationary and did not move round with the disc. The bright band was followed by a dark band and then by another bright band, which also moved round with the disc. The latter band was divided into light and dark stationary strips, like the first bright band. When the stimulus was coloured the second band showed the complementary colour. With high intensities the second band was very broad and faded away slowly. With lower intensities it was narrower and with the lowest intensities used it was narrower than the primary band.

The dark band was in general blacker than the surrounding unilluminated field; it was thus probably due in part to temporal induction from the preceding bright band, as any effect due to spatial induction would be present in the immediately adjacent portions of the surrounding field.

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When the speed of the disc was increased the first moving band widened out until it filled nearly the whole circle; the angular distance between the stationary strips was also increased, but the bright band covered a larger number of these strips. The second moving band was also broadened out and usually overlapped the primary band as the latter followed round for a second time. In some cases the second band seemed to move round on top of the primary. It was usually narrower than the primary band as the total amount of light falling on the retina was comparatively low owing to the much shorter time during which the retina was exposed. The phenomena with the increased speed were much more clearly observed with coloured stimuli owing to the difference in colour between the primary and secondary bands.

Using a stimulus of constant intensity a similar appearance was produced except that the stationary strips were absent. The second bright band always showed a gradually diminishing intensity, whereas the first usually showed slight radial variations in intensity. These lighter and darker strips moved round with the disc, instead of being stationary, as were the much more pronounced light and dark strips seen with an alternating stimulus. They were thus purely subjective and not due to stimulus variations as were the latter. They should therefore also be present when an alternating stimulus is used, although they would tend to be masked by the stimulus strips, particularly with low intensities. Their existence was, however, shown by an unpleasant flickering seen in the primary band, which in some cases could be recognized as due to the disappearance of different bright strips. This occurred when a bright part of the stimulus variation coincided with a dark portion of the subjective variation. In general this would only occur for one strip at a time, owing to the different angular separation of the two phenomena. The effect was seen best with a coloured stimulus, being most pronounced for green.

The phenomena observed with a stimulus of constant intensity have been studied by various workers,[1] and are due to complicated physiological processes in the retino-cerebral apparatus.

The explanation usually given is that, under the conditions of observation, a momentary stimulus produces a brief pulsating sensation followed by a dark interval which in its turn is followed by another less bright sensation of gradually diminishing intensity. With coloured stimuli the second sensation shows the complementary colour. (These phenomena were all observed by looking away from the slit and momentarily switching on the light).

With a moving stimulus this sequence is produced in every part of its path, so that adjacent parts of the retina show successive stages in the sequence. This will also apply when the stimulus

is of alternating intensity and the disappearance of one or more stationary strips will occur when the sensation produced, at a spot on the retina where the stimulus was at maximum intensity, reaches one of its minima. The sensation produced in adjacent parts of the retina, where the stimulus is at its minimum intensity, will then be approximately at maximum intensity; there will thus be very little difference of intensity over an area corresponding to the distance between two alternate bright strips. In general only one bright strip will disappear in this way at any given instant.

All the phenomena observed receive a satisfactory explanation on the basis of the general form of the hypothesis usually adopted to account for the phenomena observed when a moving stimulus of constant intensity travels across the retina. They thus support the hypothesis that these phenomena are largely due to the temporal course of the sensation produced by a stimulus of short duration, although spatial induction may inhibit some part of the course of sensation. This latter factor would appear to act with alternating intensity, and so to be due to the whole of the bright part of sensation, and not merely to that in parts of the retina immediately adjacent to that where inhibition took place.

The unpleasant flickering is not to be confused with that observed when a narrow object (such as a billiard cue), illuminated by an A. C. lamp, is rapidly moved to and fro laterally. This is due entirely to light and dark strips seen in the primary band. It may, however, contribute to the nervous irritation sometimes produced under these conditions, or which some people find (probably due to eye movements) with A. C. lighting under ordinary conditions.

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ROYAL LONDON OPHTHALMIC HOSPITAL (Moorfields)

IN connection with the opening of the new Lecture Hall on October 1, the following has been contributed by a correspondent.

The Out-Patient Department, Library, Lecture Room, Museum, and Pathological Laboratory were erected in 1898. The Bacteriological Laboratory was added in 1907. In 1925 Sir William Lister built and equipped a smaller lecture room for clinical demonstrations.

The Out-Patient Department had for many years been found inconvenient in use and inadequate for the increasing number of patients attending each morning. Moreover, since the original department had been built there had been elaboration in the services rendered to patients, and it had been found increasingly difficult to accommodate them all. Old students will remember the confusion in the consulting room, and refraction room; they will also call to mind the number of patients that collected around the room for minor surgery and the crowding of the third House-Surgeon's department. More recently a large L.C.C. clinic had been set up, and an Almoner's department established. There was inadequate accommodation for perimetry, and the introduction of the Bjerrum Screen had called for further accommodation.

Two years ago, in 1933, all these buildings were demolished and further ground space was obtained.

It had been felt that when the new buildings were raised to take the place of the old some attempt should be made to improve on the previous plan that had become stereotyped in all ophthalmic hospitals; several years of thought had been given to the matter and many sets of plans had been made, to be rejected or modified in the attempt to found not only a more useful building but one of artistic merit.

The first point that was decided was that each surgeon should have a separate consulting room with suitable dark room accommodation, for the investigation of his cases, immediately at hand. The second was that there should be proper facilities for the refraction of the eyes of patients, with the patient and surgeon at ease, in quiet surroundings, and the refraction rooms separate from one another. It will be seen that by an ingenious arrangement seventeen refraction units have been set up.

Another point decided upon was that new patients coming to the hospital should be 'sifted' and thus, by a judicious assembling of patients, both the patients' and surgeons' time would be economized. All this has been arranged for in the new department.

All departments had increased in size, and among others, accommodation was needed for the medical, dental, and venereal clinics, as well as those for X-ray examination, physio-therapy and orthoptic training, many of which had not been in existence when the old buildings were erected. Further, an elaborate L.C.C. department with its officers and secretarial staff was housed, and more recently a large Almoner's department established. Arrangements have been made for all their requirements in the new buildings.

So far as the Out-Patients' department and Medical School are concerned, the building is arranged in three floors.

Taking the ground floor first: Patients are admitted from Peerless Street at the back of the hospital, and enter a crush room, from which they pass into the general waiting room to be registered in the case of new patients, and receive their letters if old patients from the letter store. They are then arranged in forms allotted to the various surgeons and passed on to the desks where the sifters are at work. Here all new patients are divided into categories: refraction cases passing to a waiting room by the side of the refraction hall; minor surgical cases to a waiting room, and so to the rooms where the third House-Surgeon and Out-Patient Sister are at work. Other cases are sent to a waiting room outside the surgeon's consulting room to be interviewed by him in turn.

The refraction department is a new venture: it consists of a large hall, along each side of which are grouped seventeen cubicles, the outer doors of which communicate with the waiting hall, and the inner doors enable the patient to look across the hall at a test-type on the opposite side which is controlled from the cubicles. No one enters the hall itself. In these cubicles, the patients comfortably seated, are tested for spectacles, and when the examination is completed, are returned to the waiting room outside, and so on to the spectacle room.

Of the minor surgical cases (cysts of the eyelids, foreign body cases, etc.) a proportion are sent to the surgeon that they may be of value as teaching material.

The surgeons' consulting rooms show these general arrangements: they are about 25 ft. long and 14 ft. wide, and behind the surgeons' desks there is a common dark room for a group of three consulting rooms, whereas the two end rooms have their dark rooms separate, but immediately available. Owing to the general use of the electrically lit ophthalmoscope there is no need for the numerous divisions which were in use in the past. With the new arrangements there are suitable ophthalmic brackets conveniently placed, as well as accommodation for slit-lamps and perimeters.

The result of this is a quiet and wholesome atmosphere which makes for better and more rapid work, as well as very much less fatigue among those working in the departments.

All new cases pass to the Lady Almoner on the way to the dispensary, and patients leave the hospital by separate exits into Peerless Street.

The X-ray department has been improved and enlarged.

There are separate refreshment rooms for patients and students on the ground floor.

On the first floor which is reached by stairway and lift, there

is an extensive physio-therapeutic department and orthoptic clinic. These complete the arrangements for clinical work. Here too are the new Museum and Library, where there is enough shelf room to allow for very considerable expansion. In the Library there are a series of alcoves for readers.

On the second floor is a new Bacteriological laboratory and the Treacher Collins Pathological laboratory. Here also is the main Lecture Hall which will hold sixty students comfortably seated, and will permit the accommodation on occasions, such as clinical meetings of the Ophthalmological Society, of any number up to one hundred. Here is the epidiascope. There is also a small Lecture Room for classes up to twenty in number.

The above description applies only to the new Out-Patients department and Medical School. There are many other improvements in the hospital itself.

On the fourth floor there is a suite of thirty-one private wards of one bed each. This unit is complete with theatre and sterilizing plant. To each cataract ward in the general building there is attached a contributary ward, containing five beds, each surrounded by curtains.

The old building is undergoing re-organization. There are now two operating theatres as well as extra examination rooms and a re-arrangement of space so that now the hospital accommodates two hundred in-patients.

NORTH OF ENGLAND OPHTHALMOLOGICAL SOCIETY

Twenty-first Anniversary Meeting

THE North of England Ophthalmological Society held its 21st anniversary meeting at Manchester on Friday, October 18. The morning session was occupied by two papers and the showing of Mr. Percival Hay's film of the ophthalmological tour. Unfortunately there was not time to show the whole film, but the part exhibited gave an excellent impression of what must have been a very interesting experience for those who took part in it.

Mr. Jefferson took as the title of his paper, "The Radiology of the Optic Foramina" and explained the usefulness of such radiograms in the diagnosis of certain tumours. He then gave a fascinating demonstration of the uses of thorotrast in obtaining X-ray pictures of the intra-cranial vessels and of the ventricles of the brain. The clinical application of these methods was also

explained. Dr. Ferguson read an interesting and authoritative paper on migraine. He gave a valuable classification of the different aetiological types of this disease—a classification which should be of great assistance to those who are called upon to treat it. After lunch a series of cases was shown at the Royal Eye Hospital. Although the number of these was considerable—about 80 in all—the organization was so good that there was no difficulty or confusion in seeing the patients. Particular interest was shown in three series of cases of intra-capsular cataract extractions, the methods used being explained in the subsequent discussion. The dinner given by the Society in the evening at the Clarendon Club was a great success. After the speeches, Mr. Percival Hay was presented with a valuable antique silver mug in recognition of his services to the Society.

ABSTRACTS

I.—PATHOLOGY

(1) **Zanettin (Padua).—Ocular disease and focal infection. (Infezioni focali e malattie oculari).** *Ann. di Ottal.*, July-August-September, 1934.

(1) In many cases, diseases are found to be in close relation to inflammatory foci situated at a distance from the obvious morbid region and often of slight severity. These primary inflammations are most commonly seated in the teeth or tonsils; and the removal of the septic focus is often followed by rapid improvement in the secondary condition. Zanettin has made many experiments on patients suffering from focal infections with ocular complications; he has made cultures from the exciting focus, and with these has inoculated rabbits; many of the animals showed ocular disturbance and he concludes that the strain of bacteria has in these cases a special tendency to attack the eye. The infective material showed the presence of a streptodiplococcus. Control inoculations showed no ocular disturbance.

The ocular conditions which are especially often of focal origin are optic neuritis, inflammations of the uveal tract, of the cornea, and sclera. It is probable that the large majority of so-called rheumatic affections are really streptococcal in origin. The author thinks that much of the uveitis labelled tuberculous is due also to focal infection; he has for five years been attached to the

Sanatorium for tuberculous disease in Padua and has only once observed a case of uveitis in the known tuberculous patients.

HAROLD GRIMSDALE.

(2) **Cusumano (Palermo).—Secondary localisation in the eye in focal infection; a study in organotropism. (Infezione focale e localizzazione secondary nell'occhio. Contributo sperimentale sol tropismo elettivo batterico).** *Rass. Ital. d'Ottal.*, January-February, 1935.

(2) For these experiments **Cusumano** selected streptococcus viridans and staphylococcus pyogenes aureus as the infecting material. He inoculated the eyes of rabbits and passed the bacteria from one eye to another in the attempt to confer on the germs some tropism towards the eye. The results show that the germs are distributed throughout the body but have a preference for the eye.

HAROLD GRIMSDALE.

(3) **Bellavia (Palermo).—Ocular affections due to dental disease. (Affezioni oculari di origine dentaria con particolare riguardo a quelle interpretabili col meccanismo dell'infezione focale).** *Rass. Ital. di Ottal.*, November-December, 1934.

(3) **Bellavia** has investigated some cases in which dental disease gave origin to ocular complications. He cultivated the bacteria from these cases and injected them into rabbits. In some of the rabbits there followed slight and fleeting ocular disturbances; this may show, in the author's opinion, a mild oculotropism of the bacteria cultivated.

HAROLD GRIMSDALE.

(4) **Sena, J. A.—A free tuberculous nodule in the vitreous. (Nodulo tuberculoso libre en el cuerpo vitreo).** *Arch. de Oftal. de Buenos Aires*, Vol. X, p. 419, June, 1935.

(4) **Sena** quotes a case of a male child, 13 years of age, who was brought to his clinic, having suffered from iritis for one month. After he had been treated with atropine, a small spherical white body was seen moving fairly freely in the vitreous. There was a certain amount of vitreous haze which prevented a view of the fine details of this body. Examination with a slit-lamp revealed numerous keratitis punctata and an oedematous iris with adhesions, and a greyish exudate which covered the pupil. With the ophthalmoscope the fundus could not be seen.

The left eye was completely normal in every respect. The body in the vitreous was thought to be an intra-ocular cyst due to a parasite, *i.e.*, a cysticercus and the iritis simply due to the

reaction in the uveal tract on account of the toxins of the parasite.

There was, however, only 1·33 per cent. of eosinophiles in the blood count and 34 per cent. of lymphocytes; Mantoux test was negative. The total red blood count was 4,400,000. The physician reported that the child was somewhat under-developed, and an X-ray of his chest revealed bilateral hilum glands with calcified spots, showing the existence of a tuberculous infection. In the course of two months there were repeated attacks of irido-cyclitis with purulent deposits in the anterior chamber.

The eye was enucleated. Examination of the mass revealed a well-defined capsule, which was surrounded by very fibrous vitreous with a profuse infiltration of lymphocytes and large mononuclears. The nodule was attached behind by a band to the retina, the mass itself showed the presence of typical tuberculosis giant cells. It also showed areas of calcification. The tuberculous process was not confined to the retina but had also affected the ciliary body and the iris.

The pathology of this condition is discussed in some detail and the article is illustrated with some excellent microphotographs.

E. E. CASS.

(5) **Strampelli (Rome).—Ocular tubercle and lipolytic enzymes. (Tubercolosi oculare ed enzimi lipolitici dell'organismo).** *Boll. d'Ocul.*, November, 1934.

(5) Though the presence of anti-bodies has been shown in tuberculous patients, these are very weak and have very little immunizing power. They are therefore capable of producing little process of cure; they have, however, value as diagnostic agents; the acquired sensitivity of all the tissues in tuberculous subjects is at the bottom of von Pirquet's reaction. But though these anti-bodies have negative therapeutic value, there is another way of assisting the production of immunity which has been neglected in the past. It is well known that the fats of the tubercle bacillus have the power of causing caseous necrosis of the tissues if injected subcutaneously. Ghiron has shown that lipolytic ferments derived from various organs and especially from the liver, have the property of diminishing the virulence of the tubercle bacillus; these esterases are specially active in the liver of swine infected with tubercle. **Strampelli** has employed these esterases in the treatment of ocular tuberculosis and reports two cases in which their use was speedily followed by recovery. The immediate result is an increase of the symptoms but after two days, improvement is rapid.

HAROLD GRIMSDALE.

(6) **Damel, C. S. and Villegas, R. R. (South America).—Neurinoma of the orbit. (Neurinoma de la orbita).** *Arch. de Oftal. Hisp.-Amer.*, Vol. XXXV, February, 1935.

(6) **Damel** and **Villegas** state that neurinoma of the orbit is a very rare tumour. They have only been able to find 12 cases in the literature on the subject and in these cases the nomenclature has varied considerably, according to the authors' conception of the pathology of the condition.

The case that they themselves describe is that of a young man, 36 years of age, who had a past history of syphilis, and had had erisypelas on the left side of his face. For three years he had had a gradually increasing proptosis of the left eye; when examined by the authors he had an appreciable proptosis of the left eye with some deviation laterally and downwards. The vision was normal, and nothing abnormal was found in the fundus. As the Wassermann reaction was still positive in spite of previous treatment, they gave him further anti-syphilitic treatment.

Three months later, when seen again, a tumour could be felt in the orbit, and there was some limitation of upward and outward movements of the eye. The pupils were equal and reacted well; the vision was still normal, but there was some oedema of the disc.

An operation was performed, and a tumour was found situated between the optic nerve, which supported it like a hammock, and the roof of the orbit. The tumour was removed and convalescence was uneventful. The vision was normal after the operation, and the oedema of the disc disappeared.

The tumour itself was about 1½ in. long, and it had a small central cavity. On the surface it showed various zones of haemorrhages with numerous yellowish-white areas.

The microscopic appearance of this tumour is described at some length.

These tumours appear in young people, they have a slow growth, and there is very little pain or symptoms until the tumour grows so large that it causes limitation of movements, diplopia or loss of vision when the tumour presses on the optic nerve.

In the authors' opinion the tumour originated in the nerves of the dura-mater of the optic nerve.

E. E. CASS.

(7) **Filippi-Gabardi (Bologna).—Benign melanosis of the eye. (Melanosi oculare benigna).** *Arch. di Ottal.*, July-August, 1935.

(7) **Gabardi** has had the opportunity of observing three cases of this rare condition. Of these, two were congenital; in the third

case, the melanosis had appeared, or at least had enormously increased after pregnancy.

In all three the condition was unilateral; in all the pigmentation of the sclerotic was accompanied by excess of pigment in the iris and choroid. It is probable that in all cases the excess of pigment in the iris and uveal tract is congenital, and that the pigment in the episclera is deposited later.

HAROLD GRIMSDALE.

(8) **La Ferla (Catania).—The histogenesis of intra-ocular melanomata. (Contributo alla istogenesi dei melanomi endoculari).** *Lett. Oftal.*, April, 1935.

(8) La Ferla thinks it probable that all sarcomata of the uveal tract have, as starting point, a pigmented epithelial patch, so-called naevus of the choroid. These cells under some provocation take on atypical development. This means that these tumours are ectodermal in origin, springing either from the pigmented epithelium of the retina or from the chromatophores of the uveal tract; these are to be considered as neuroglial elements which differentiate into melanoblasts and finally, taking a branched or spindle shape, are true chromatophores. All uveal melanosarcomata, in this view, are neuro-epitheliomata.

HAROLD GRIMSDALE.

II.—REFRACTION AND MOTOR ANOMALIES

(1) **Ochapovsky, Prog. S. (Krasnodar).—Genesis of the refraction of the human eye.** *Arch. of Ophthal.*, September, 1935.

(1) The principal interest in Ochapovsky's article lies in his views as to the genesis of myopia, which he regards as being due to the action of social forces. In a primitive society, say in the hunting tribes, persons with large errors of refraction stand a poor chance of surviving and bringing up progeny. This is borne out by statistical examination of wild tribes which shows that the refraction of 90 per cent. of them lies between 2 D. of hypermetropia and 1 D. of myopia. In a highly developed society, with fine crafts and handiworks, myopic eyes have a bigger survival value and in past times guild organizations provided myopes not only with a living, but through hereditary transmissions of forms of labour, fixed their myopia as a hereditary property. The opposite process occurred in the upper classes of feudal society where war and hunting were the order of the day, and a myopic

boy born to parents in this class would be predestined to another career which required schooling and the knowledge of reading and writing. The upshot of this process is that social factors do not create new variants but that they allow formerly non-adaptable mutations to spread and take root among certain groups of the population. Myopia is thus hereditary and not an acquired condition.

F. A. W-N.

(2) **Rolett, Daniel (New York).—Is full correction of value in checking the progress of myopia?** *Arch. of Ophthal.*, September, 1935.

(2) Rolett over a period of five years (1916-1920), followed up 772 myopes at the University of Bern. The following are some of his conclusions:—The real cause of myopia is as yet unknown, the most plausible being a "heredobiologic process." Myopia usually comes to a standstill at adolescence; it is more prevalent and severe in women and despite full correction showed a definite tendency to progress in 73 per cent. of patients. Only 1·7 per cent. of patients with advanced progressive myopia retained normal vision while 72·3 per cent. of them showed pathological changes in their fundi. Opinions are divided as to the advisability of wearing a full correction in myopia, some authorities (Goldsmidt, Waetzold and Schall) stating that it tends to cause increase of the myopia.

F. A. W-N.

(3) **Venco (Pavia).—Unilateral myopia. (Studi sulla miopia monolaterale).** *Ann. di Ottal.*, February-March, 1935.

(3) Little notice hitherto has been taken of this condition, says **Venco**, and yet it is not uncommon. He has tabulated the numbers of patients showing this defect among the total of over twenty-six thousand seen at the clinic in Pavia during the years from 1905 to 1933 and finds only 85 cases of unilateral myopia. He has grouped these as regards their ages and finds that the condition increases in frequency gradually up to the age of fifteen and then increases rapidly to twenty-three, when it falls again so that at twenty-eight it is no more common than it was at fifteen. (From this it would at first sight appear that unilateral and indeed all myopia was a very fatal disease, but more probably it shows that such figures have no real meaning. It is not possible to imagine that the percentage of cases would drop from 35 per cent. to 10 per cent. during those years).

The author concludes that when the difference in refractive error is large, the myopic eye is often amblyopic, but when the

difference is small, appropriate correction for each eye may often be used with advantage.

As to the cause of this defect, he thinks that it is often possible to see in the emmetropic eye changes in the fundus similar to those which are regarded as characteristic of myopia. This tends to show that the emmetropic eye has had a tendency towards myopia which has however not developed. When the difference is small binocular vision may persist; sometimes vision is alternant, the emmetropic eye being used for distant sight and the myopic for near. This may happen even when the myopic eye has not full normal acuity.

The author advises the use of full accurate correction, except in the case of great difference where it is clearly useless.

HAROLD GRIMSDALE.

(4) **Anastasi (Florence).—Unilateral myopia (La miopia monolaterale).** *Boll. d'Ocul.*, March, 1935.

(4) **Anastasi** has collected 1541 cases of this error; he concludes that the condition is generally congenital or develops during the first ten years of life; it rarely appears later but is then often complicated by corneal scars. The author thinks that the presence of such scars leads to myopia. In his experience full correction can be worn only in exceptional cases.

HAROLD GRIMSDALE.

(5) **Bielschowsky, Alfred (Breslau).—Lectures on motor anomalies of the eyes.** *Arch. of Ophthal.*, December, 1934.

(5) In this introductory lecture, **Bielschowsky** emphasizes the fact that the primary object of movements of the eyes is to bring the retinal images of subjects which attract one's attention on to the maculae. The movements are essentially binocular. In cases of apparent movement of one eye only, there are still binocular nervous impulses. Thus, in adduction of the right eye, such as occurs when the gaze is transferred from a distant to a near object both of which are in line with the left eye, what actually happens is that there are two impulses, one for convergence, the other for turning the eyes to the left. In the right eye, these two impulses reinforce each other, so that the eye is turned markedly to the left, whereas in the left eye they neutralize each other and no movement occurs. The same reasoning holds true when testing sursumvergence with prisms. If, for example, the maximum prism which can be placed base down before the right eye without causing diplopia is 7$^{\Delta}$ the same prism will prove to be the maximum which can be placed base up before the left eye. After such tests

there is likely to be a residual hyperphoria which may take 10-15 minutes to disappear. Even the cases of double or alternating hyperphoria can be made to fit into this scheme. The condition is one in which either eye on covering turns upward. If the screened eye is watched, it will be seen to be moving slowly up and down at irregular intervals, while if the fixing eye be gradually obscured by a wedge of dark glass being moved across it, it will be found to move below the horizontal plane in almost exact proportion to the amount of darkening. The condition is due to alternating and intermittent excitations of both the positive and negative centres for vertical divergence. The condition is often associated with a horizontal deviation and if this is cured it may disappear.

F. A. W-N.

(6) **Pavia, J. L., Dusseldorf, M. and Durando, S. A. (Buenos Aires).—Strabismus. Its semi-operative treatment. Myocampsis and tenotomy and some reflections on the first sixty five cases of myocampsis. (El estrabismo. Su correccion semi-operatoria. Miocampsis y tenotomia. Consideraciones sobre las primeras 65 miocampsis realizadas).** *Rev. Oto.-Neuro-Oftal. Sud.-Americana*, Vol. IX, p. 318, Oct. 1934.

(6) **Pavia, Dusseldorf, and Durando** think that the essential cure for a squint is the shortening of a muscle, and that in some cases it is necessary for this shortening to be accompanied by tenotomy of the antagonist. They mention that good results have been obtained by means of advancement, following Lagleyze's technique, but they add that this operation is difficult to perform on children under local anaesthesia.

Myocampsis differs from other methods of correction in that it is sub-conjunctival and no cutting of the tissues is needed, "it is a semi-surgical method" as Lacarrère has shown.

The myocampter (as designed by Barraquer) consists of forceps which hold a silver clip, and lying centrally between the blades of the forceps is a hook which can be moved up and down by means of a screw. This hook is used for picking up the muscle and has a sharp point for piercing the conjunctiva. The conjunctiva, Tenon's capsule and the underlying muscle are picked up with fixation forceps and the hook is passed through the conjunctiva and under the muscle. The muscle is then pulled away from the sclera and is folded between the blades of the forceps. This is accomplished by raising the hook. When it is in the desired position the blades of the forceps are closed and this shuts the silver clip and fixes it in the muscle.

The anaesthetic used is 4 per cent. cocaine in the conjunctival

sac and also an injection of novocaine in the muscle. The operative and post-operative pain is very slight. The clip holds together a fold of conjunctiva and muscle. In some cases the fold becomes congested, with haemorrhages and tends to form granulomata. In other cases the fold becomes white and necrotic. This depends upon the force with which the blades of the forceps are closed and the strength of the silver clip. A considerable inflammatory reaction occurs round the clip.

Usually the clip comes off by itself, but if after two or three weeks it is still holding it has to be removed with forceps.

Some slight stretching of the muscle may occur later.

Myocampsis corrects deviations up to 15 degrees. Myocampsis and tenotomy combined 20-30 degrees. For a squint of 30-45 degrees myocampsis and tenotomy accompanied by a myocampsis of the other eye is required. According to Alvaro a millimetre of shortening corrects 2° of squint. For example, a fold of 5 millimetres (which shortens the muscle 10 millimetres) would correct 20° of squint. The authors themselves have performed 65 operations of myocampsis. In 10 cases tenotomy had to be performed as the myocampsis was insufficient. In 8 cases myocampsis combined with tenotomy in the same eye was performed, and in only one case myocampsis in the other eye. The correction in this case was for 30°

Ten clips detached themselves, three before the fifth day, four between the fifth and tenth day, and three after the tenth day. The remainder had to be removed.

The authors give several photographs of patients treated by this method and a table showing the angle of the squint before operation, the method of correction, the number of operations, and the final result.

E. E. CASS.

III.—RETINA AND OPTIC NERVE

(1) **Wölfflin, E. (Basle).—A contribution to the pathological anatomy of renal neuro-retinitis. (Ein Beitrag zum pathologish-anatomischen Befund der Neuroretinitis albuminurica)** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCIII, p. 446, 1934.

(1) **Wölfflin** reports the histological findings in a patient, who had died from chronic nephritis at the age of 58 and, during the last year of his life, had shown the classical appearances of renal retinitis. It was found that the retina was thickened to 3-4 times the normal. Many cystic spaces of varying size were

present giving the retina a porous appearance. Many of the cysts were confluent; they contained a clear fluid though a few were haemorrhagic. Migration inwards of Müller's fibres was present; traced forward they were found to break up and become absorbed. Within the cysts a fine network of fibres could be seen and the cysts themselves never broke through either inwards or outwards. These cysts were present in large numbers in the central area; at the periphery the typical cystic spaces of Iwanoff were present. The external limiting membrane was separated from the neuro-epithelium, itself markedly disorganized, by a transudate. The choroid was much thickened, but contained no infiltrates; signs of endarteritis obliterans were present throughout. Thickening of the vessel wall was also present in the iris.

The author concludes that the changes are the results of arterial hypertension. The white exudates seen in the fundus correspond to a number of different pathological processes, most commonly oedema. The changes in the vessel wall of both choroid and retina he considers secondary to the arterial hypertension, but the fibrinous exudate and the proliferation of the neuroglia indicate that a toxic factor is also at work. A difficulty is presented by a peculiar deposit in the outer nuclear layer; it appears light-brown with van Gieson's stain and shows up a fibrous structure; the possibility of their being "Drusen" bodies is suggested.

ARNOLD SORSBY.

(2) **Senâ, J. A. (Buenos Aires).—Retinitis exudativa externa. (Coats disease). A contribution to its anatomical aspects. (Retinitis exudativa externa. Contribucion a se estudio anatomico).** *Arch. de Oftal. de Buenos Aires*, Vol. IX, p. 387, 1934.

(2) **Senâ** says that although anatomically and clinically, the retinitis exudativa of Coats, the retinal degeneration with miliary aneurysms of Leber and the retinal angio-gliomatosis of von Hippel are identical processes, characterized by alterations in the retinal vessels and the presence of exudates, they differ considerably in their aetiology and more especially in their pathology.

In the retinal degeneration with aneurysms the vascular alterations are primary to those degenerative changes occurring in the retina; whilst in Coats' disease there is a true inflammation of the retina originating from toxic emboli, and the vascular alterations are secondary.

Again, according to Lindau and Juris, the angio-gliomatosis of von Hippel is associated with angiomata and cysts in the central nervous system, numerous organs and in the skin, and is

not, therefore, a local ocular disease, but a manifestation of alterations in the vascular system.

The author quotes many references to cases of these conditions which have occurred from time to time in the literature.

The retinitis of Coats' is usually unilateral; its progress is slow; it usually occurs in young people of less than 25 years old, and the male sex is more commonly affected.

In the early state of this disease there are small white exudates, which later become yellow, and over which there is superficial swelling; these exudates become confluent, haemorrhages occur, and finally detachment of the retina may supervene. Pain is produced by increased tension, and this condition is sometimes diagnosed as glioma.

The exudates most frequently occur in the peripapillary region. Coats stated that the alterations in the retina were caused by haemorrhages, which, originating in the external layers, had become organized. Leber confirmed these findings of Coats.

There are many changes in the retina, which is considerably thickened; there is much sero-fibrinous infiltration, and cells carrying fat granules are formed in the pigment layer; cholesterin crystals are found among the fat cells. Connective tissue is laid down between the retina and the choroid; the choroid does not participate in this process.

In the vessels is a proliferation of endothelium, accompanied by much stretching and dilatation until true aneurysms are formed.

The retinal detachment is caused by sero-fibrinous exudate, and the pigment layer is destroyed. Coats gave the name "ghost cells" to poorly coloured bodies which are present in the sub-retinal exudate, and contain small pigmented granules; the author considered them to be swollen leucocytes; according to Leber they are the remains of the degenerated pigment epithelium, and other authors think they are cells from the reticulo-endothelium system.

In reality, it is difficult to ascertain the precise pathology of these cases, as an exact histological examination has only been carried out in an advanced state of the disease.

In a case that the author himself discovered, he was able to observe the anatomy and histology in an eye excised for secondary glaucoma. The child was 4 years old.

History.—At the age of 1½ years the child had an inflammatory process in both eyes, and after, it was noticed that the right eye was divergent. He was brought to the author, as for one month his eye had been irritable and painful. The child was ill and had lost weight. Both parents were healthy.

On examination the right eye showed slight ciliary injection. The cornea was clear, and a detachment of the retina was present. The retina was swollen and yellow in colour; the retinal vessels did not show much alteration in the periphery, but in the posterior pole they were much more changed. There was no perception of light; the tension was +2.

The eye was excised, and on examination the choroid and sclerotic were found to be normal. The retina was thickened, and almost completely detached. There was much exudate, forming a mass occupying the sub-retinal space, and separating the retina from the choroid. The retina was specially thickened in the parts where exudation was seen. There was no cupping of the disc, but the nerve head was swollen, and the central vessels were dilated. A microscopical examination showed that the choroid was unaffected and that the process was localized in the retina, more especially in the external layers.

In some regions, apart from the thickening, the retina presented its normal structure, in others there had been destruction of the pigmentary layers, the layer of rods and cones and the external granular layer; in other regions all the layers of the retina were affected.

The retinal vessels showed infiltration and dilatations, but the author did not find any true vascular aneurysms. The sub-retinal exudate was homogeneous, but in it were spaces containing cholesterin crystals. A few other places had a granular aspect, and there, were seen pale round cells with one or more nuclei, and with pale and granular protoplasm, containing numerous small and pigmented granules; these were the "ghost cells" of Coats.

In the retina there were regions of necrosis, and others where there was connective tissue concentrated round the pigment cells, cholesterin and giant cells.

There were no haemorrhages observed in the retinal tissues, but much haemorrhage in the vitreous.

E. E. CASS.

(3) Pavia, J. L. (Argentina).—Berlin's oedema and the changes in the choroid and retina which follow it. (Edema de Berlin y alteraciones corio-retinianas consecutivas). *Rev. Oto.-Neuro.-Oftal.*, Vol. IX, p. 289, 1934.

(3) **Pavia** describes four cases of Berlin's oedema following comparatively light blows on the globe, one being due to a pellet of paper. In the first case which is described in much detail, the vision began to fail 48 hours after the blow. On examination there was a marked oedema of the macula, and surrounding the disc were numerous small red areas. Three weeks after the injury the macular oedema had practically disappeared, and the vision had improved from 3/10 to 5/10.

In the second case both macular and peripapillary oedema were marked. In the third case a sub-conjunctival haemorrhage was present, as well as the retinal oedema; the vision was reduced to 7/10. In the fourth case there was some ciliary injection, the pupil reacted sluggishly and there was an anterior capsular cataract.

The vision recovered completely in 13, 25 and 65 days in cases I, III and IV respectively. (The second case was not seen again after the first examination).

The prepapillary haemorrhages absorbed completely. Pigment deposits were observed in cases 1, 3 and 4, in the region of the disc. Slight mottling was still present at the maculae.

The author quotes Chou on the emigration of the pigment into the tissues in these cases. The contusion injury upsets the nutrition of the external layers of the retina, and results in these pigment deposits.

The author regards the small haemorrhages in the region of the disc as being due to rupture of small choroidal vessels.

E. E. CASS.

(4) **Gallenga (Turin).—Observed spontaneous healing of a retinal hole. (Osservazione oftalmoscopica di formazione e di guarigione spontanea di rotture retiniche).** *Rass. Ital. di Ottal.*, November-December, 1934.

(4) **Gallenga** records and illustrates an interesting case in which a tear in the retina was seen after a blow; the patient was detained in hospital and in the course of a few days two other holes appeared. Their gradual closing was watched. The first stage in the development of these secondary ruptures was the appearance of small grey patches, which the author considers as ischaemic, and thinks that this produced a lessened resistance of the retina and so led to rupture.

HAROLD GRIMSDALE.

(5) **Hesky (Trieste).—A case of spontaneous hole in the retina in a myope without detachment. Discussion on the various factors in the production of detachment. (Caso clinico di foro spontaneo nella retina in occhio miope senza distacco con lembo completament staccato nel vitreo. Considerazioni alla stregua dei concetti attuali sul distacco di retina).** *Boll. d'Ocul.*, January, 1935.

(5) Though Gonin's work has done much to improve the treatment of retinal detachments, their origin still remains obscure, and especially the share played by the vitreous in their production. The nature of the vitreous is itself uncertain and until this

point and others are cleared up we cannot hope for complete understanding of the problem. A hole in the retina is not by itself sufficient to cause detachment. Cases have been recorded of holes which were seen ophthalmoscopically and remained without subsequent detachment.

Hesky records a case of high myopia in which a hole was observed in upper periphery; a body was seen floating in the vitreous a little in front of the retina and casting a shadow on it, which he regards as the fragment of retina torn from the hole. The condition remained unchanged for nine years, and the patient has not been seen since. The author thinks that in this case there was abnormal adhesion between the retina and the hyaloid membrane of the vitreous.

He considers that the occurrence and appearance of a retinal detachment depend largely on whether the hyaloid and the retina were adherent, when the hole in the retina was made or whether they were already separated, and the shrinking vitreous had become detached from the retina.

HAROLD GRIMSDALE.

(6) **Bucalossi (Pisa).—A comparison of the various forms of adhesive choroidoretinitis following diathermy and chemical cauterisation of the sclera. (Corioretinite adesiva da diathermocoagulazione superficiale e da causticazioni chimiche della sclera.** *Ann. di Ottal.*, December, 1934.

(6) **Bucalossi** discusses the various modifications of Gonin's operation that have been suggested during the last few years; he has attempted to evaluate their several advantages by experiments on rabbits. In all cases the active agent was applied to the scleral surface and no perforation made. He comes to the conclusion that the zone of adhesion is limited, in diathermy, to the points of contact of the electrode. When chemical cauterisation is employed, the area of adhesion is greater, and its size can be controlled by the amount of caustic used and the time of application; hence the chemical method, he thinks, offers most advantages in the case of large disinsertions and multiple ruptures.

HAROLD GRIMSDALE.

(7) **Raverdino (Brescia).—The treatment of detachment of the retina due to tubercle and showing no rupture. (Sulla cura del distacco retinico, senza rottura a etiologia tubercolare).** *Boll. d'Ocul.*, March, 1935.

(7) The various modifications of Gonin's operation which have been used of recent years in the treatment of detachment of the retina with a hole, serve to show how great is the advance due to

Gonin's initiative in the treatment of that disease, which, until his method was adopted, was considered almost hopeless. As is well known the basis of his operation is the setting up of an exudative choroiditis to glue the retina down and thus close the hole; in some few cases, as in the one described here, the detachment is due to exudation from a tuberculous choroiditis, and further inflammation of the choroid is to be avoided. Since in this case the most careful examination revealed no rupture, **Raverdino** trephined the sclera about 15 mm. from the limbus, in the region of the detachment and perforated the choroid. The fluid raising the retina was evacuated and eventually the retina returned to place and useful sight was regained.

The treatment of the general condition was carried on and this also was successful.

HAROLD GRIMSDALE.

(8) **Giannantoni (Perugia).—Lesions of the retina and optic nerve from electricity. (Lesioni della retina e dell nervo ottico da elettricita).** *Lett. Oftal.*, January, 1935.

(8) Electric lesions are becoming more common with the increased use of electricity in every day life. The eyes may be affected in many different ways and to different degrees.

Giannantoni has made a series of experiments on rabbits with the object of determining the lesions of the nerve and retina which are commonly brought about by an electric shock. In some cases he employed a current sufficient to cause immediate death, in others a smaller dose was given repeatedly at intervals of many days for a long period. He finds that the results vary with the individual, and with the course of transmission; thus a current passing through the body from the upper limb to the lower on the opposite side gave graver results than a current passing between the limbs of the same side.

He finds that in the retina the multipolar cells and the internal granular layer are specially affected; in the nerve the damage is chiefly in the axis cylinders. The longer the exposure, the greater the damage. The paper is illustrated by microphotographs showing the condition of the nerve and retina.

HAROLD GRIMSDALE.

(9) **Burian, H. (Berne).—Radiating pigment stripes in the fundus. (Ueber die rosenkranzartigen Pigmentstreifen im Augenhintergrund).** *Zeitschr. f. Augenheilk.*, Vol. LXXXIV, p. 293, 1934.

(9) **Burian** reviews the literature on beaded pigment stripes and adds three cases of his own. Apart from the characteristic

beaded appearance of pigment stripes along sclerosed choroidal vessels, and an associated hypertensive or renal retinitis, about half of the recorded changes have shown myopic fundus changes. In all cases high blood pressure was present and but little albumen in the urine. Occurring in old people, evidence of central arterio-sclerosis was present in all cases, whilst renal involvement was not marked. The author holds that the essential lesion is a peri-arteritis of the choroid and that the retinal arterio-sclerosis is not a necessary concomitant. Whilst vision is grossly affected, the prognosis to life is not altogether bad.

ARNOLD SORSBY.

IV.—MISCELLANEOUS

(1) **Weinstein, Paul (Budapest).—The relation of glaucoma to blood pressure.** *Arch. of Ophthal.*, February, 1935.

(1) **Weinstein's** paper opens with a short statement of the factors which are thought to control the intra-ocular pressure, namely the blood pressure in the capillaries, the osmotic pressure of the blood proteins and the semi-permeability of the capillary endothelium. Using a Plesch tonoscillograph the author found that the systolic blood pressure in patients with glaucoma ranged from 120 to 230 and in the non-glaucomatous from 120 to 200, the corresponding diastolic figures being 60 to 110 as against 60 to 95. He therefore feels that, arterial hypertension does not predispose to glaucoma. If the precapillary blood pressure is measured by Bailliart's tonometer a higher reading is obtained in the glaucomatous than in the non-glaucomatous patients, but this increase is only passive because if Seidel's instrument be used, which measures the pressure in the extra-bulbar anterior ciliary arteries, the higher pressure is not found. The condition of the capillaries in glaucoma is probably a factor of importance. Using Herzog's method of measuring the resistance of the capillaries in the epidermis the normal figure was between 40-50 mm. Hg whereas in glaucoma it was under 40. This indicates a higher capillary pressure and also that the patients are vaso-neurotic. When the intra-ocular capillaries dilate, the pressure in them lessens but the volume of the contents of the eye increases and therefore the intra-ocular pressure. In cases of glaucoma secondary to thrombosis of the central retinal vein, the precapillary vessels are narrowed and the walls of the larger vessels are stiffer.

F. A. W-N.

(2) **Mayer, Leo. L. (Chicago).—Chronaxia and the Eye.** *Arch. of Ophthal.*, February, 1935.

(2) Chronaxia is the time, measured in thousandths of a second (sigma), during which a current of twice the threshold intensity must flow to produce a minimal stimulation. Measurements may be made from the sensory or the motor standpoint. With regard to the latter there are for animals and men three general values: small from 0·06 to 0·14 sigma, medium from 0·16 to 0·34 sigma and large from 0·40 to 0·70 sigma. The proximal parts of the body have smaller chronaxias than the distal, and the ventral muscles smaller than the dorsal. Synergic muscles form a separate group characterized by having the same chronaxia. On the sensory side, a considerable amount of work has been done by measuring the chronaxia for production of a phosphene by electrical stimulation of the eye. The values obtained are considerably higher than those in other organs. The peripheral retina gives from 1·2 to 1·8, the central from 2·1 to 2·7 sigma. The rods and cones themselves are supposed to be unaffected by the current used, the stimulus acting on their neurones. Even so, however, the figures are suggestive of the functional difference between rods and cones. Disease of the eye may alter its chronaxia and changes have been found in such conditions as optic atrophy, choroido-retinitis and retinal detachment. In two cases of cataract, disease of the posterior portion of the retina was diagnosed by alteration of chronaxia and the bad prognosis given, was verified after operation by finding an old choroido-retinitis. That the mechanism of electrical stimulation differs from that of light is shown (1) by the fact that a dark adapted eye has a chronaxia many times greater than one adapted for light. (2) That a light stimulus may act for as short a time as 2×10^{-7} seconds and yet be visible. This figure is much lower than that obtaining when an electrical stimulus is used.

F. A. W-N.

BOOK NOTICES

Blindness and the Blind in the United States. By HARRY BEST. Pp. 714. New York: The Macmillan Company. 1935. Price, 28/-.

The object of this work is "an examination of the blind and of their estate from the point of view of the social economist—the presentation of something of what has come to be known as a 'social survey' respecting them." Such a survey must be the essential preliminary to a scientific approach to the prevention

of blindness and the means whereby the State may effectually ameliorate the *condition* of the blind. Attempts in this direction have not been wanting in England—notably in the activities of the Departmental Committee of the Ministry of Health on the Prevention of Blindness (1922), and of the Prevention of Blindness Committee of the Union of Counties Association for the Blind at present sitting. It must be admitted, however, that no such comprehensive survey has hitherto been available as is contained in this volume of the conditions which obtain in the United States.

The book is divided into seven parts:—

I. Blindness and possibilities of its prevention; II. General condition of the blind; III. Provision for education of blind children; IV. Intellectual provision for adult blind; V. Material provision for blind; VI. Organizations interested in the blind; VII. Conclusions with respect to work for the blind.

The facts are based almost entirely upon United States' data. These are most elaborate, and have been statistically analysed from almost every conceivable point of view. Such statistics are of course liable to considerable errors, but there can be no doubt that a vast amount of useful information has been accumulated, and it is incontrovertible that no body seriously interested in the welfare of the blind can afford to neglect this work.

It is certain that many causes of blindness are avoidable, even if the author's statement "that perhaps well over two-thirds, perhaps almost three-fourths, of it might have been avoided by means known to us" is far too optimistic.

Radium Treatment of Skin Diseases, New Growths, Diseases of the Eyes and Tonsils. By FRANCIS H. WILLIAMS, M.D. Pp. 111, illustrations, 12. Boston, Massachusetts: The Stratford Company. *Price, 2 dollars.*

Part 2 of this little book is devoted to radiotherapy for diseases of the eye. In the introductory chapter to this part the author has written somewhat boldly:—"It may be stated with confidence that radium can be of more service in more diseases of the eye than any single remedy hitherto at our disposal."

Three out of the 4 chapters dealing with radiotherapy for ocular diseases are concerned with corneal opacities, cataract and retinitis pigmentosa respectively. This selection is as unfortunate as the results of radium treatment for these disorders are uncertain and unconvincing. The remaining chapter about diseases of the eyelids consists of less than one page devoted to a statement that for new growths of the lid radium has become the treatment of choice, no statistics having been given as to the nature of the growths and the result of treatment, and a few lines to a case of ectropion treated by radium.

In this book no mention is made of the value of radiotherapy for epibulbar malignant growths or of the recent work which has been done on the treatment of malignant intra-ocular neoplasms such as glioma retinae, sarcoma of the uveal tract and angiomatosis retinae by radium, neither is radiotherapy for spring catarrh and other chronic inflammatory states discussed. Nor are there warnings of the dangers of radiotherapy and such unpleasant sequelae as corneal necrosis, cataract, and necrosis of the orbital wall. The reviewer is left with the impression that the best evidence for the case of radiotherapy in diseases of the eye has not been called upon but instead the author has brought forward material most of which yields results which are very difficult to assess and are in most instances unconvincing.

Szemészet Pp. 280, with numerous illustrations. Budapest. 1935.

This is a jubilee number dedicated to Professor Emil de Grósz, celebrating the 30th year of his Professorship and the 70th year of his age.

It contains 31 short papers by his colleagues and is published in the Magyar language. For the benefit of such as ourselves, who have not the Pentecostal gift of tongues, an index in English is provided.

The number reflects great credit on all partaking in its production and we feel sure will be a source of great gratification to the distinguished professor of ophthalmology at Budapest.

CORRESPONDENCE

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIRS,—Your note in the August number which I unfortunately missed seeing at the time is liable to be misconstrued. I was the guest of the Ophthalmological Section of the American Medical Association, and the very generous fee which they gave me for my lecture was not the Knapp Memorial Prize though it was provided out of the Knapp Testimonial Fund which provides for all the expenses of the Ophthalmological Section. The Knapp Medal is only very rarely given and is a separate thing which has not been presented for many years. The honorary membership, on the other hand, is of the American Medical Association and not a sectional thing.

Yours faithfully,

LESLIE PATON.

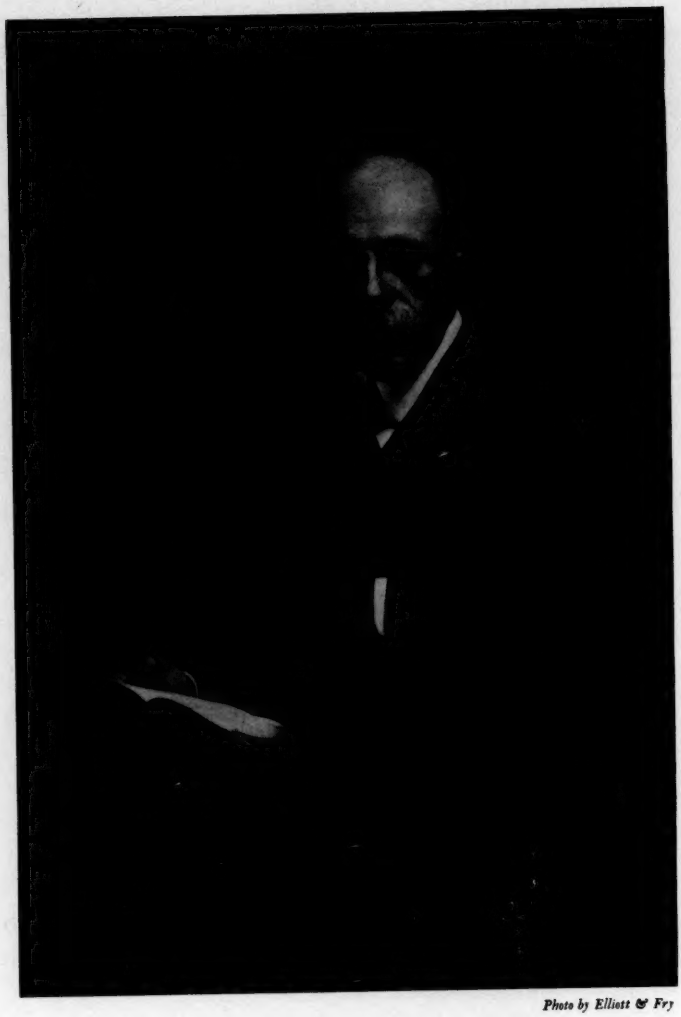

Photo by Elliott & Fry

WILLIAM ADAMS FROST (1853—1935)

OBITUARY

WILLIAM ADAMS FROST

ONE of the very small band of original members of the Ophthalmological Society died on October 25, in the person of Mr. Frost. It is nearly 30 years since he retired from practice and to most of the younger members of the profession he was merely a name. But, in his day, he was one of the best known members of the ophthalmic circle and his work as librarian of the society from 1885 to 1906 should not be forgotten.

Born in 1853, Mr. Frost was the son of Charles Maynard Frost, a surgeon in practice in Ladbroke Square. He was educated at the Kensington Grammar School and entered St. George's Hospital in 1870. As a student he had a successful career and was a prizeman of the school in 1874, in which year he took his qualification and was house surgeon to the hospital, his colleague in office being the late Sir William Bennett.

After his term as house surgeon was over he became a clinical assistant at the Central London Ophthalmic Hospital, and having taken his F.R.C.S.Eng. in 1878, he succeeded McHardy as Ophthalmic Registrar at St. George's. At this time Brudenell Carter had been in sole charge of the ophthalmic department for some years, and in 1881 Frost was elected Assistant Ophthalmic Surgeon to St. George's. In 1883, he joined the staff of the Royal Westminster Ophthalmic Hospital, and he was also for some years ophthalmic surgeon to the Victoria Hospital for Children. He won the Middlemore Prize of the British Medical Association in 1882 and again in 1886.

On Mr. Carter's resignation of the Senior post in 1892, Frost naturally succeeded to the vacancy. He had served as junior for eleven years, and though Carter may not have been an easy person to work with at all times the pair got on capitally. Frost himself recorded his gratitude to Carter in his obituary notice of his old chief. The two were very different. Carter, with his incisive tongue and brilliant literary qualities, did not suffer fools gladly and in his teaching, was, as Frost said, apt to assume a knowledge of the subject on the part of his audience, which was seldom as great as he seemed to imagine. Frost, on the other hand, was an excellent teacher of elementary matters, best in the wards and outpatient department, where an occasional humorous sally would enliven the discourse; but as a lecturer his rapid delivery made his remarks less stimulating. Mr. Frost retired from practice in 1906 and went to live at Forest Row in Sussex; but he served

during the latter part of the war as visiting ophthalmic surgeon to the London County War Hospital at Epsom.

A professional man's career is not always helped by the possession of private means, but in Frost's case this enabled him to do very good service to the profession apart from his position as surgeon and teacher. His Fundus Oculi, published in 1896, was for years the best atlas on the market and it has been used for teaching all over the world. In the preparation of this work he had the assistance of Mr. A. W. Head and the plates, reproduced by colour lithography, are still, in the opinion of many, the finest plates of the fundus that have ever been produced. At present the atlas has been superseded by drawings, made with the electric ophthalmoscope, which show up the finer details which escaped notice 40 years ago, but in its day Frost's Atlas was *facile princeps*.

With Carter he wrote a small handbook of ophthalmology which was published in Cassell's Clinical Manuals series in 1887, and he contributed a chapter to his brother-in-law, Mr. H. E. Juler's, Ophthalmic Science and Practice.

Frost's ophthalmoscope is a beautiful instrument. It is rather more complicated in structure than that designed by Morton, having two wheels set close together by which the batteries of + and − lenses are moved to the sight hole.

Early in 1918 Frost had the misfortune to lose an eye from secondary glaucoma; later the remaining eye was affected with primary glaucoma, which, in spite of treatment, left him very gravely handicapped. He was a pathetic figure at Hospital gatherings, at which he was a very regular attendant until quite recently. An old friend used generally to come with him to lead him about. But in spite of his handicap Frost was always cheery. In middle age he was fond of riding and he had several rather bad accidents; apart from these he had good health and enjoyed a game at golf.

The writer was his last House Surgeon but one in the spring of 1906. He would like to record here his appreciation of Frost's great ability and kindness.

British ophthalmology will wish to express their sincere sympathy with Mrs. Frost, his partner in married life for more than 54 years, in her bereavement.

Mr. Harold Grimsdale writes:—

The death of my old colleague Mr. Adams Frost removes almost the last of the original members of the Ophthalmological Society. I had the honour and pleasure of working with him as clinical assistant and afterwards as assistant surgeon for fifteen years, and it was due to his encouragement that I became interested in

ophthalmology. It was always a pleasure to work with him; he was so keen in everything that he undertook, and so long as his assistants were keen also he would spare no pains in his endeavour to help them. He loved teaching and so long as he was on the Staff no student at St. George's could fail to learn the most important elements of ophthalmic surgery. He did not write much; his book on the Fundus with illustrations by A. W. Head was his chief contribution to ophthalmic literature; the little text-book for students, which he wrote in collaboration with Brudenell Carter was never so well known as it deserved to be. His model artificial eye for teaching the use of the ophthalmoscope is very efficient for its purpose, more so than any other that I am acquainted with. Frost's keenness went beyond his work; he was an enthusiastic cyclist and, later, motorist; he hunted, he golfed, he played bridge, he enjoyed all that he did. It was a tragedy that in the last years of his life, he who had done so much to help the sight of others, should himself become blind, but he faced this calamity with patient courage.

The position of the specialists to St. George's Hospital, when Frost was appointed ophthalmic surgeon, was an anomalous one; they were elected by the Medical Committee as lecturers in their specialty, and then appointed by the Hospital Board to look after the cases referred to them by the surgical and medical staff. This appointment was for five years, at the end of which term they were eligible for re-election. It was during Frost's term of office and largely as a result of his personality that this anomaly was ended, and the specialists became a recognized part of the Hospital staff.

DR. CLARENCE LOEB

WE were sorry to see an obituary notice of Dr. Loeb in the October number of the *Amer. Jl. of Ophthal.* Our readers will, we think, be interested in a short abstract of this notice, for Dr. Clarence Loeb's name was very well known in this country.

Dr. Loeb was born in 1876 and received his training at the University of Missouri, where he graduated M.A. in 1897. Two years later he graduated in medicine from the Marion Sims College and after holding the usual appointments in the St. Louis City Hospital, he came to Europe for post-graduate ophthalmological study in Berlin and Vienna.

On his return to the States he was appointed Ophthalmic Surgeon to his old hospital and later became Assistant Professor of Ophthalmology in the St. Louis University.

Dr. Loeb's literary alibity was well known and was such that he was, for many years, Associate Editor of the *Amer. Jl. of*

Ophthal., as well as Editor of the *Trans. Amer. Acad. of Ophthal. and Oto-laryng.*

He was the author of numerous papers and he translated Franke's "Ocular Therapeutics."

Dr. Loeb "was a man of sterling uprightness and unimpeachable character, strictly ethical . . . and straightforward . . . " No better tribute to a man's life-work could be made than this. His health broke up about five years ago and he died on May 26, 1935.

His premature loss is a great blow to ophthalmology.

GEORGE YOUNG, M.D., of Colchester

DR. GEORGE YOUNG, Ophthalmic Surgeon to the Essex County Hospital, whose death at the early age of sixty occurred on October 30, was born in Bucharest, where his father, Dr. Young, was attached to the Court in a medical capacity.

He was educated at Zürich and studied medicine there and in Philadelphia, taking his M.D. Zürich in 1901. In 1902 he came to England and took his M.R.C.S., L.R.C.P. He worked in the Ophthalmic Department at the London Hospital under Roxburgh and also at Moorfields, where he became a clinical assistant. He also studied under Professor Fuchs in Vienna. In 1908 Young went to the United States, qualifying there by obtaining the M.D., New York State, and he practised in New York until 1914. He was Assistant Surgeon to the New York Eye and Ear Infirmary and Ophthalmic Surgeon to the Central and Neurological Eye and Ear Infirmary, and did much work in association with the late Dr. Marple. On returning to England in 1914 he immediately volunteered for the Army, but was not accepted, so he settled in Colchester, where he was appointed Ophthalmic Surgeon to the Essex County Hospital and he did much valuable work amongst the soldiers during the war.

As can be gathered from his professional record, he was an extremely good linguist, and a man of very wide experience. In his professional work the subject that probably interested him most was the treatment of glaucoma. He was very enthusiastic about the miotic treatment of suitable cases, and he worked out with the tonometer how frequently pilocarpine had to be used to keep the tension within normal limits and found that he was able to control cases satisfactorily by this method. For those requiring surgical treatment he devised the operation known as double sclerectomy and published his first results in the *Trans. Ophthal. Soc. U.K.*, in 1924, and he described the operation again with his latest modifications at the last meeting of the

Oxford Ophthalmological Congress in 1934. He became a member of this in 1917 and I believe never missed a meeting. He was a great lover of Oxford and to show his appreciation, wished to take the Diploma in Ophthalmology of that University, but he was persuaded instead to undertake the task of giving the lectures on physiological optics, which he did in spite of indifferent health and often at considerable inconvenience to himself. He worked for hours endeavouring to perfect his lectures and took an immense amount of trouble in making them as helpful to his audience as possible.

In addition to his ophthalmic work, Young was a man of extremely wide interests, the foremost of which was music. He was late Chairman and President of the Colchester Chamber Music Association and was also closely associated with the Colchester Music Club and his patience and perseverance with young artists has encouraged many to shine in the art which he so dearly loved. He was a great friend of Mr. Albert Sammons, with whom he often played in public. One of his many hobbies was the making of violins, many of which are now being used by young artists. Another hobby of his was rose growing, which, living where he did in the neighbourhood of several noted rose nurseries, he could indulge in freely.

Persian rugs, architecture and animals were other interests of his, in fact, it was difficult to find a subject in which he was not interested or to mention anything about which he had not a surprising amount of knowledge and information to impart. With it all he was modest and unassuming and never pushed himself in a way that he might justifiably have done.

He was the essence of kindness and good nature and his loss will be deeply mourned by his many friends and his patients, rich and poor alike.

P.H.A.

NOTES

Royal London Ophthalmic Hospital

On Monday, October, 1, 1935, the new Lecture Hall was opened and the first lecture delivered by Mr. Percy Flemming, Consulting Surgeon to the Hospital. The lecture was entitled "Where and what was Moorfields?—A Chapter in the History of London."

Mr. Theodore Luling took the chair. The lecture, which was illustrated by lantern slides mainly of old maps of the Moorfields area, traced the gradual development of the district with which Moorfields Eye Hospital has been associated from its establishment in Charterhouse Square, its transference to Blomfield Street, and then to City Road.

National Society for the Prevention of Blindness, Inc.

THE following have been elected Vice-Presidents of the Society:—Dr. G. E. de Schweinitz, of Philadelphia; Dr. John H. Finlay, Associate Editor of the New York Times; Miss L. D. Wald, President of the Henry Street Settlement, New York City. Other Hon. Vice-Presidents of the Society are Senator T. P. Gore, Helen Keller and Mrs. W. Holt Mather.

Dr. Walter B. Lancaster, of Boston, and Dr. Bernard Samuels have been elected to the Board of Directors.

FUTURE ARRANGEMENTS

1935

December 3.—Midland Ophthalmological Society, at Birmingham Eye Hospital (Middlemore Lecture).

December 6.—North of England Ophthalmological Society, at Leeds.

December 13.—Royal Society of Medicine, Section of Ophthalmology (Clinical Meeting).

1936

January 10.—Royal Society of Medicine, Section of Ophthalmology.

February 4.—Midland Ophthalmological Society, at Stoke (Royal Infirmary).

February 7.—North of England Ophthalmological Society, at Newcastle-on-Tyne.

February 14.—Royal Society of Medicine, Section of Ophthalmology.

March 6.—North of England Ophthalmological Society, at Liverpool.

March 12.—Royal London Ophthalmic Hospital, Annual Dinner.

March 13.—Royal Society of Medicine, Section of Ophthalmology (Clinical Meeting).

March 27.—North of England Ophthalmological Society, at Sheffield.

April 3.—Midland Ophthalmological Society, at Nottingham Eye Infirmary.

May 22.—Midland Ophthalmological Society, at Addenbroke's Hospital, Cambridge.

June 12.—Royal Society of Medicine, Section of Ophthalmology (Annual Meeting).

October 6.—Midland Ophthalmological Society, at Birmingham Eye Hospital.

December 1.—Midland Ophthalmological Society, at Birmingham Eye Hospital.

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *October, 1935.*

TERRY and JOHNS. Uveal sarcoma—malignant melanoma.
KATZ and LEDOUX. Measurement (Roentgenometry) of antero-posterior diameter of the eyeball *in situ* correlated with micrometer measurement following enucleation.
BIELSCHOWSKY. Congenital and acquired deficiencies of fusion.
LEINFELDER. Ocular complications in neuroblastoma.
GUIBOR. Strabismus in children corrected by refraction alone.
LANOU. Bacillus pyocyaneus infection of the eye.
MASSOUD. Trachoma as an endemic disease in Egypt.

Annales d'Oculistique. *September, 1935.*

BAILLIART. Professor Gonin (1870-1935).
KIEWE and MANEFF. Congenital and familial bilateral melanosis of the eye and face. Contribution to the subject of consanguinity.
LAGRANGE, H., and LAGRANGE, A. M. The loss of the pupillary reflex of adaptation to light. (The semeiological value of the Argyll Robertson sign.)
NIZETIC. The operative treatment of traumatic iridodialysis.

October, 1935.

KAPUSCINSKI. Contribution to the question of oculo-focal affections.
JOSEPH. End results of antiglaucomatous operations.
REDSLOB and REISS. Action of the middle pH on the state of inflation of the vitreous body.
DVORJETZ. Epidemic encephalitis and the visual apparatus.

Archives d'Ophtalmologie. *October, 1935.*

MÁRQUEZ and VELILLA. Marginal degeneration of the cornea, two new cases.
PASCHEFF. The true conception of the operative cure for retinal detachment: closing the hole or drainage and provoked adherence.
VIALLEFONT and DIACONO. The rôle of vitamins in ophthalmology.
HALBERTSMA. True congenital distichiasis.

Revue d'Oto-Neuro-Ophtalmologie. *September-October, 1935.*

REBATTU and COLRAT. Ocular paralysis concurrent with otitis and mastoiditis.
JAYLE, ALLIEZ and PAILLAS. Disorders in the excitability of the vertical canals in two cases of ocular palsy. Some disassociated automatic-reflex palsies of vestibular type.
JAYLE. Considerations on the cortico-oculogyric centres.

Klinische Monatsblätter für Augenheilkunde. *October, 1935.*

VON SZILY. Trachoma transmission on to a guinea-pig's brain.
SCHMIDT. Spectrum analysis as a safe method of demonstrating metals in human eyes and their adnexa.
CHOUN. Statistics on the prognosis of uveal sarcoma.
LÖWENSTEIN. Tuberculosis of the eyes. VIII. The question of the origin of recurrent vitreous and retinal haemorrhages in young persons.
DE DECKER and ARENDT. The efficacy of ultra-short waves in the diseases of human eyes
CHOJNACKI. A contribution to the knowledge of plasmocytic granuloma. (Plasmomata conjunctivae.)
BLOBNER. Spontaneous iris stroma cyst.
KUNZ. Metastatic iritis associated with spondylarthritis ankylopoietica.
NEUMAN. Premature operative treatment of ocular erosions, their experimental and anatomico-pathological basis.
PAMEIJER. A strange familial superficial corneal anomaly.
CHARLIN. Microscopical cicatricial trachoma.
VON GERNET. Further experience with tarsal implantation in trichiasis.

VON CSAPODY. Remarks on Professor Sattler's work "Experience with contact glasses."

STREBEL. Recognition and correction of causes and symptoms in asthma treatment or pollen allergy and the anti-allergic therapy.

Bollettino d'Oculistica. *August, 1935.*

FOCOSI. Acute retrobulbar neuritis secondary to herpes zoster.

ORZALESI. Aetiopathogenetic and clinical considerations on some retinal affections that are manifested by the appearance of white spots glittering in the fundus: a case of retinitis circinata in an eye previously affected with central retinal vein thrombosis.

DE CORI. Experimental and clinical research on the action of a lipolytic enzyme.

September, 1935.

FOCOSI. Contribution to the study of acute retrobulbar neuritis.

ORZALESI. Histological observations on the reparative process of a sclero-corneal section eight days after cataract extraction.

DE CORI. Some useful observations on the correction of ametropia.

PANICO. Biomicroscopical aspect of the recti muscles.

VITO. Further contribution to the study of the intradermal reactions as a diagnostic aid in trachoma.

MAESTRO. Experimental oculotropism of the streptococci.

FAZIO. Histopathological research on the chiasma, the optic nerves and retinae in animals nourished on a diet devoid of vitamin B.

DE SANCTIS. Initial symptomatology of hereditary luetic parenchymatous keratitis.

RUBINO. Cataract in a subject with diabetes mellitus, nanism and hypophyseal cachexia.

CAVARA. Observations on the surgical treatment of idiopathic retinal detachment with particular regard to the diathermy method.

October, 1935.

FOCOSI. Correction for close work in myopia.

ORZALESI Contribution to the diagnosis of keratoconus.

DE CORI. Persistent severe oedema of the lids in trachomatous subjects.

PANICO. Some anomalies of the lacrymal puncta.

MOSCARDI. Contribution to the knowledge of congenital aniridia. Cases of total and partial aniridia in the same family.

TRISTAINO. Investigations with the Congo red method of the reticulo-endothelial system in trachoma.

PUGLISI-DURANTI. Typical colobomata of the choroid and of the macular region. Unilateral macular coloboma and arachnodactyly.

BENCINI. Further remarks on Jensen's retino-choroiditis.

Archivos de Oftalmologia Hispano-Americanos. *October, 1935.*

LOPEZ. Posterior lenticonus and false lenticonus.

ARRUGA. Actual position of treatment for retinal detachment.

CANOVAS. Ocular tuberculosis and its treatment by Spengler'e immunising bodies.

ARJONA. Genealogy of a family with juvenile cataract and of another with retinitis pigmentosa.

Archivos de Oftalmologia de Buenos Aires. *July, 1935.*

PEREIRA. Detachment of the retina and diathermy.

Revista Oto-Neuro-Oftalmologica y de Cirugia Neurologica Sud Americana. *October, 1935.*

HERNANDEZ, PAVIA and DUSSELSORP. Tuberculous bacillaemia and tuberculoma of the sclera.

Revista Cubana de Oto-Neuro-Oftalmiatria. *May-August, 1935.*

DI FEDE. The medical cure of cataract.

CEPERO and COMAS. Ophthalmic diathermy and the arsenobenzols.

ESTEBAN. Small technical details of Denig's operation.